UNITED STATES ARMY

FEBRUARY 1988

AVIATION DIGEST

Professional Bulletin 1-88-2

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PROFESSIONAL BULLETIN

1-88-2 • FEBRUARY 1988

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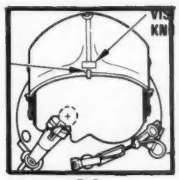

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Second class postage paid at Daleville, AL, and additional mailing offices.

Active Army units receive distribution under the pinpoint distribution system as outlined in AR 310-2. Complete DA Form 12-5-R and send directly to CDR, AG Publications Center, 2800 Eastern Boulevard, Baltimore, MD 21220. For any change in distribution requirements, initiate revised DA Form 12-5-R.

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Major General Ellis D. Parker
Chief, Army Aviation Branch

New Milestone in Operational Testing for the Aviation Board

THE USE OF computer technology to meet military needs is not a new concept. The need for computing large amounts of military data during World War II led to the development of a large relay computer.

Shortly after World War II started, a substation of the U.S. Army's Ballistic Research Laboratory was opened at the University of Pennsylvania to help produce firing and bombing tables for the U.S. Army. Work began on the development of the first all-electronic, general-purpose computer in the spring of 1943. The computer, called ENIAC (Electronic Numerical Integrator and Computer), was successfully completed in the winter of 1944 to 1945.

We have come a long way since 1945. Today, computers perform a wide variety of tasks for the U.S. Army.

During the past year, computer technology has played a significant role in operational testing conducted by the Army Aviation Board, Ft. Rucker, AL. This technology was prevalent in the force development test and experimentation of the progressive phased maintenance (PPM) concept for aviation conducted at Ft. Campbell, KY. PPM is a scheduled maintenance concept that consolidates the daily, phased and special inspections. Its effectiveness is complemented by a newly developed automated aircraft maintenance management system that consists of a PPM management module and a logbook automation system (LAS). The system will eventually be incorporated into the Standard Army Multi-Command Management Information System that is user friendly and requires little or no background in computer operations. Important also is what automation can do for us in the future. For example, LAS and PPM will be able to capture accurate demand data much like our stockage levels are determined in the current supply system. This will allow for growth in adjusting our inspection intervals throughout a component's life cycle, while identifying weaknesses in our system.

A computer generated voice, the voice interaction avionics (VIA) system, was part of the next evaluation. The Army Aviation Board completed the first phase of an assessment of a new concept in voice communication. This system allows the aircrewmember to communicate orally with various radios. This includes radio selections and frequencies for that radio. VIA, when mounted in an OH-58C Kiowa, consists of equipment hardware and software working together with a computer generated voice that talks to the pilot, giving him critical information. "VIC," to his friends, is a computer generated voice that tells the aircrewmember which radio is tuned to what frequency, the unit designation and call sign. During a tactical situation, VIC would be an invaluable copilot. As VIC tunes radios, finds call signs and frequencies and provides current communications-electronics operation instructions information, all from verbal commands, the crewmember's attention remains outside the aircraft, and his hands remain on the controls. This evaluation represents only the first phase toward development of advanced technologies being planned for the light helicopter experimental effort.

Automated data collection and data reduction were key factors in executing the initial operational test and evaluation of the Multiple Delivery Mine System (VOLCANO) (air delivery system) conducted at Ft. Lewis, WA. Personal computers were used for data reduction, quality control and information feedback. The VOLCANO mine dispenser system will satisfy two major needs: to provide Army light and heavy forces with a helicopter and ground-delivered scatterable mine capability, and to provide Marine forces with a similar deployable mine dispenser. The ultimate objective of VOLCANO is to provide a single, common mine and dispenser for air and ground application. Each of the four UH-60 Black Hawk helicopters used in the test were instrumented with a video theater to collect data on airspeed, altitude, ground speed, heading, time, event marker tones and voice tracts. Data on installation, removal, mission flights and mine fields were manually collected.

The track file recorder (TFR) will be used to obtain detailed, accurate flight data from the AN/APR-39A (V)1 radar warning receiver for reduction and analysis after a flight. In the past, radar data from a 1-hour tactical scenario took more than 6 man-hours to reduce to a usable format. With the TFR, this same data are reduced, partially analyzed and printed in 20 minutes. The TFR employs electrically erasable read-only-memories as the nonvolatile data storage medium. This system will be used in future tests such as Phase II and III of the aircraft survivability equipment test, the initial operational test and evaluation of the UH-60 Black Hawk HELLFIRE system and the AN/ALR-XXX(XO-1) radar frequency interferometer.

The use of computer systems in conducting tests and evaluations represents a significant milestone in operational testing for the Army Aviation Board, but it is only the beginning. Computer systems will continue to play a vital role in future operational tests and evaluations by increasing efficiency and capability.

ALFA

AirLand Forces Application AGENCY

Bridging the Interoperability Gap

AirLand Forces Application Agency Staff
Langley Air Force Base, VA

SINCE ITS inception in 1975, the AirLand Forces Application Agency, better known as ALFA, has been a bridge between the Army and Air Force in the development of AirLand Battle (ALB) concepts. This bridge has been expanding over the years and ALFA has evolved into one of the focal points for furthering the joint warfighting capabilities between all the Services. The resulting relationship has been highly productive in enhancing the development of ALB concepts and improving multi-Service interoperability.

ORGANIZATION

ALFA was originally created to manage the increasing workload of joint actions between the United States Air Force Tactical Air Command (TAC) and the United States Army Training and Doctrine Command (TRADOC). The interface of these two commands was formalized with the establishment of a Joint Actions Steering Committee (JASC). The JASC is ALFA's governing body and is compromised of the TRADOC Deputy Chief of Staff for Doctrine and the TAC Deputy Chief of Staff for Plans.

In 1984, the TAC and TRADOC dialogue expanded to include the U.S. Navy's Atlantic Fleet (LANTFLT) at Norfolk, VA. The interface with LANTFLT was through its director of operations, who is now a JASC participant. This interface involved not only fleet headquarters, but also subordinate surface and air commands. A memorandum of agreement (MOA) was developed to define the scope of the LANTFLT involvement, and in March 1984 it was signed by the commanders of TAC, TRADOC and LANTFLT. Then in the summer of 1985, LANTFLT received authorization from the Chief of Naval Operations to speak for the entire Navy on ALFA projects.

In May 1984, a similar MOA was approved by the commander of the Marine Corps Combat Development Command (MCCDC) at Quantico, VA. ALFA's interface with MCCDC was through its Doctrine Center director, who also is a JASC participant.

It is important to understand that ALFA's work with these headquarters focuses on joint concepts, tactics and procedures, not on individual Service doctrine. Working under the direction of the four general officers who comprise the JASC, and with the involvement of major command headquarters of all four Services, the ultimate task for ALFA is to improve Service interoperability.

ALFA is located at Langley Air Force Base, VA, the home of TAC. This location is only 7 miles from TRADOC, 12 miles from LANTFLT at Norfolk and a 3-hour drive from MCCDC.

To perform its unique mission, ALFA is authorized 10 officers: 5 Army and 5 Air Force. The ALFA director and deputy director are both colonels, with one being Army and the other Air Force. The director's position rotates annually between the two Services. The present director is Air Force Colonel Cato L. Reaves. The staff officers are divided into two-man teams (each team consists of one Army officer and one Air Force officer), and each team is assigned several projects.

MISSIONS AND ROLES

The agency's mission is to develop, coordinate and integrate activities associated with joint efforts to improve concepts and procedures for the conduct of coordinated and effective joint warfighting. ALFA's goal is to develop the concepts and procedures necessary to win future conflicts, and to define joint needs in terms that enhance resource decisions. Three products result: joint concepts, procedures and needs. The action officers (AOs) work relatively unconstrained by doctrinal issues or roles and mission disputes. Their objective is to manage the development of concepts and practical procedures, and they support their work with the analysis necessary to identify shortfalls and joint problem areas.

This diversity of joint efforts raises the next point, which is how joint work gets started. ALFA's work centers on the priority concerns of the commanders of the participating major commands. A recommendation for joint work may be made to the JASC by any activity; however, the JASC must jointly agree to a program before ALFA can become actively involved.

ALFA's role, therefore, is managing and coordinating JASC directed joint work. Consequently, the AOs have broad operational backgrounds rather than narrow technical expertise. ALFA has the authority to form joint working groups from within the staffs and subordinate organizations of the JASC, since this is where the technical skills exist. In order to obtain direct field input, these groups also include worldwide representation down to squadron and battalion levels.

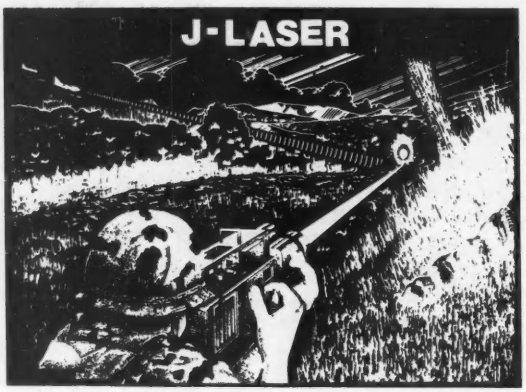
Before a product is approved by the appropriate commanders of TAC, TRADOC, LANTFLT and MCCDC, it must be staffed and coordinated worldwide. If two or more Service chiefs approve an ALFA product, it may become a joint Service agreement (JSA). These agreements serve as the basis for the further development of joint doctrine and supporting procedures. Ultimately,

JSAs could result in Joint Chief of Staff publications.

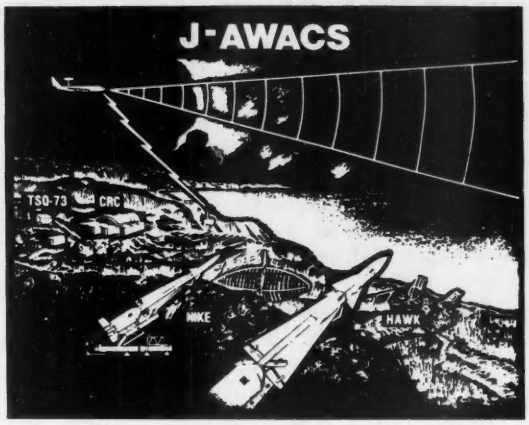
The final ALFA product is normally a four Service joint procedures pamphlet. The information contained within these pamphlets is then further field tested and validated in multi-Service and joint exercises. Efforts are currently underway to incorporate these procedures into such training vehicles as Army Training and Evaluation Programs, the National Training Center, Red Flag/ Green Flag and the Joint Readiness Training Center. Also, each project has an implementation plan, developed by the respective Services, as a part of the publication. This plan identifies documents and curricula where the pamphlet's information should be incorporated. ALFA's efforts, therefore, have a major impact on the hardcover manuals of the four Services. It remains, however, each individual Service's responsibility to incorporate the information contained within these pamphlets into their Service manuals, training and operations.

COMPLETED PROGRAMS

ALFA pamphlets are easily recognizable because of their distinctive green and blue camouflage covers. Several ALFA pamphlets have met with outstanding success and are widely used throughout the joint operations community. "Joint Suppression of Enemy Air Defenses (J-SEAD)" and "Joint Attack of the Second Echelon (J-SAK)" have both been elevated to JSA status by the Army and Air Force Chiefs of Staff. This effectively raises the status of J-SEAD and J-SAK from joint tactics, techniques and procedures to joint Service doctrine.



Other successful ALFA products include "Joint Light Amplification by Stimulated Emission of Radiation (J-LASER) Designation Procedures," "Joint Application of Firepower (J-FIRE) Reference Guide," "Joint Air Attack Team (JAAT) Operations," and "Joint Airborne Warning And Control System (J-AWACS)-Army Voice Operating Procedures"—all of which are available through normal publications distribution channels.



UPCOMING PROGRAMS

Not only are ALFA staff officers participating in joint exercises around the world to integrate/validate existing programs, but they also are managing several new ALFA programs under development. Three previously published projects, J-FIRE, J-SEAD and JAAT, are under revision. The remaining programs are entirely new and are designed to fill identical shortfalls in joint Service interoperability.

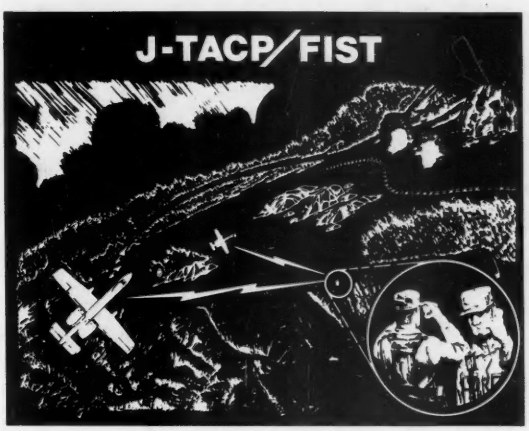
A list of programs currently being managed by ALFA, along with a brief descriptive statement of each one, is provided below. The remaining programs are entirely new and are designed to fill identified shortfalls in joint Service interoperability.

- The **J-FIRE** project provides a reference so that units of one Service can rapidly and correctly request fire support from another Service. In July 1985, the original J-FIRE pamphlet was published with about 43,000 copies distributed worldwide. ALFA is currently working on a revision of the pamphlet to update and expand the guide

with additional technical data and also make it North Atlantic Treaty Organization compatible where appropriate to do so.

• **Joint Coordination of Fires Forward of the Fire Support Coordination Line (FSCL)** is a project that will result in an information pamphlet for joint coordination of deep fires. Lack of Army doctrine and nonstandard FSCL procedures, combined with new long-range Army weapons (Lance, multiple launch rocket system, Army tactical missile system) have pointed to the need for such a publication.

• **Joint Army/Air Force Tactical Air Control Party (TACP)/Fire Support Team (FIST) Close Air Support (CAS) Operations.** The purpose of the new pamphlet is to describe the interrelationship of Army FISTs and Air Force TACPs in the control of CAS missions. The pamphlet includes J-FIRE, the J-LASER, joint authentication, integration of artillery and CAS, and night CAS capabilities/limitations.

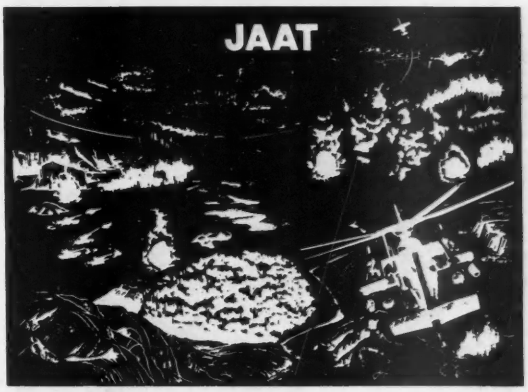


• Effective and coordinated **Joint Deception Operations** (J-DO) are a proven and inexpensive combat multiplier on the battlefield. This project will result in a pamphlet that describes J-DO procedures at the joint force and the component levels.

• The **Joint Night (J-NIGHT)** or **Adverse Weather Combat Operations** project will identify and analyze U.S. Forces' capabilities and limitations that are unique to night or adverse weather combat operations.

• In 1982, ALFA published a TAC/TRADOC **J-SEAD** pamphlet. The new J-SEAD project will update the information and procedures presently contained in that publication.

• The **Joint Rear Battle** project will develop a concept to provide a framework for the many individual Service efforts underway to secure the rear area.

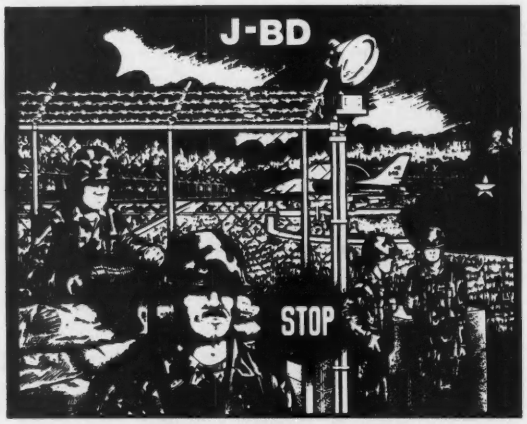


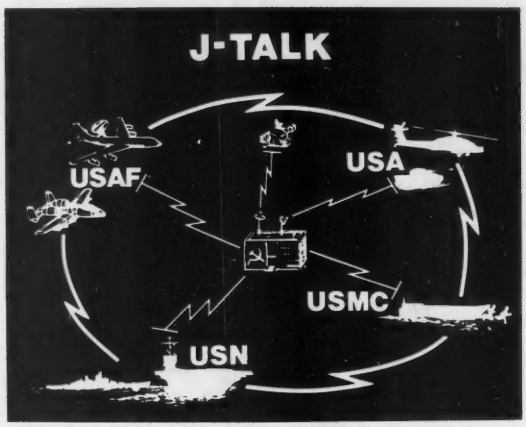
• The **JAAT** was last published in 1983. The revised pamphlet will include the newest tactics, training programs, equipment descriptions and scenario options. It also will include a checklist format section on planning, coordinating and organizing a JAAT.

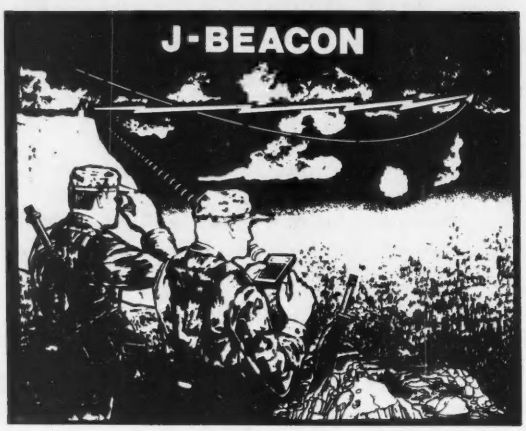
• The **Joint Base Defense (J-BD)** project is to develop operating procedures and security precautions for commanders to protect their units at joint bases outside U.S. territory.

• **Joint Communication Procedures for Have-Quick Radios (J-TALK),** Volume I, is designed to develop standardized, four Service procedures for worldwide operations of the various have-quick, jam-resistant radio systems.

• **Single Channel Ground and Airborne Radio System (SINCGARS) Joint Communication Procedures for Have-Quick Radios,** Volume II, is designed to develop







standardized, four Service procedures for the joint operation of the SINCGARS radio systems.

- The **Joint Radar Beacon (J-BEACON)** procedures project will provide joint tactics, techniques and terminology for the tactical employment of surface-located radar beacons during combat operations.
- **Joint Combat Search and Rescue (J-CSAR)** is the most recent project for ALFA and for the first time includes the Coast Guard in one of ALFA's initiatives. The project will include a listing of joint SAR resources and will include a review of Service SAR doctrine, training and equipment issues.

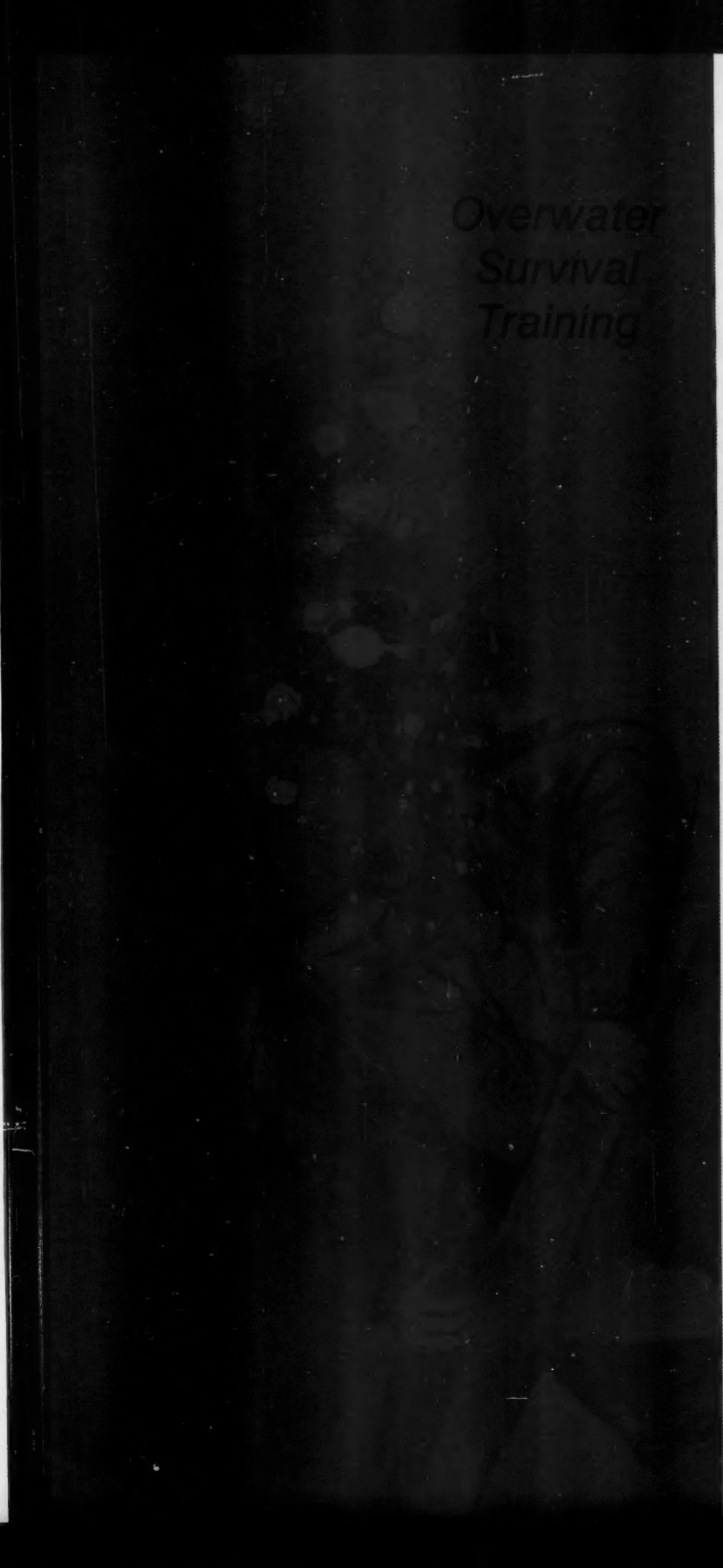
AIRLAND BULLETIN

Since 1977, ALFA has published a quarterly joint information newsletter known as the *AirLand Bulletin*. This publication provides an avenue of two-way communication between ALFA and some 3,500 subscribers worldwide. It is a medium for the free exchange of ideas, and it provides information on recent developments in the joint arena. Feedback from bulletin subscribers, who include Guard, Reserve and Active forces of all Services, indicates that this publication is beneficial in the dissemination of new ideas and recommendations on how to improve joint warfighting. A subscription to the bulletin can be received by writing to ALFA.

SUMMARY

ALFA is a small organization with a large mission. Originally a TAC and TRADOC bi-Service agency, it has expanded in scope by the increasing involvement of LANTFLT and MCCDC. Twelve of the fourteen programs currently being developed at the agency involve at least four Service commands. Since ALFA interfaces with all the Services at the major command level and below, its products are typically more tactically oriented and geared for the user when compared with other joint publications. By attacking interoperability problems at the operator's level, ALFA is performing a valuable function to enhance our joint warfighting capabilities.

The ALFA Agency may be contacted by writing: HQ, TAC/XP-ALFA, Langley AFB, VA 23665-5001 or ALFA Agency, HQ TRADOC, ATTN: ATDO-ALFA, Ft. Monroe, VA 23651-5000; or by telephoning AUTOVON 574-5934 or Commercial 804-764-5934.



Overwater Survival Training

Sergeant Nyleen Mullally
Minnesota Army National Guard
St. Paul, MN

AS I BUCKLED myself into my seat in the 9-D5 helicopter dunker for the first dunk, my reasons, both personal and professional, for being in this situation were buried someplace deep in my thoughts. They were not important anymore. What was important was taking all the steps we had been instructed to take earlier that morning by the instructors at the Miramar Naval Air Station (NAS) Water Egress School. But I'm getting ahead of myself and should start at the beginning.

My position as the personal flight equipment handler at the Army Aviation Support Facility (AASF), (Army National Guard) in St. Paul, MN, requires that I inspect and maintain all aviation life support equipment (ALSE) and related equipment. I believe that I also should be familiar with the application and use of this equipment so that I may instruct the crewmembers with some personal experiences.

Although I had attended a cold weather survival course, I felt I needed to continue my survival training with the Overwater Survival Course that is offered by the Army Western Region ALSE Survival School (see *Flightfax*, 8 October 1986) at North Island NAS in San Diego, CA. The course is instructed entirely by the Navy, using their facilities and equipment. I submitted an application, along with the AASF ALSE officer, CW3 Tom Ollhoff, to attend in September 1986. After our applications were approved all that remained was the wait.

As the time to go grew nearer, I sought out others who had been through any kind of water survival training, to try and get an idea of what to expect. All of the people who had experienced it were ex-Air Force, Navy or Marine aviators who had been required to go through the training while they were in an Active Duty status. They all felt that it was extremely good training; therefore, I received many good pointers and "I've been through it" words of wisdom. Nobody that had been in the Army exclusively had received any such training, although one individual did have an actual experience to relate that happened while he was in Vietnam. He had been shot down while flying low level over a river, and had no problem making egress from his aircraft after it had sunk.

CW3 Ollhoff and I arrived at North Island NAS in San Diego and checked into billeting ready to begin training the next morning. There were about 30 other members of the Army National Guard and Reserve in our class from various states in the 6th U.S. Army Region. It is interesting to note that there were several members present from a Reserve unit in Utah that had experienced a recent mishap that put one UH-1 Huey and two aviators into the Great Salt Lake for 4 hours before being rescued. Water egress/survival training (see *Flightfax*, 16 July 1986) had apparently taken on a higher priority for members of that unit!

We began our training at 0600 hours the next day, at the Aviation Physiology Training Department, Miramar NAS, with an introduction and instruction on what we would be required to do during the 2-day course. The adrenalin started running at full speed the instant I sat down in the classroom, and it didn't stop until it was all over! After our physicals were checked and weak swimmers were screened, we were fitted with our equipment and made our way to an outside pool for the 75-yard swimming qualification. Our equipment consisted of a flight suit, boots, helmet and personal flotation device (PFD) that we had been told would *not* inflate.

I am a good swimmer, but I had never swum with full flight gear on, and had visions of sinking to the bottom like a rock. When I jumped into the water, however, I came right back up to the surface, due in large part to the natural bouyancy of the helmet. During the 75-yard swim, we had to demonstrate proficiency in the breast stroke, back stroke and side stroke, all of which were fairly easy to do, although it took much more energy with all the gear on. Five of the students did not make it through the swim, and were not allowed to complete the course, even though several of them were better than average swimmers. It was a sobering experience to watch those who thought they knew what to do struggle so hard and still not make any progress through the water.

After everybody finished the swimming qualification, it was back into the pool for a practice helicopter hoist out of the water, complete with rotor wash. Again, I had no difficulty with this task, and was ready for the next phase.

We were all taken into a large room, where the 9-D5 helicopter dunker was, to demonstrate how well we could swim underwater. The pool under the dunker was 15-feet deep, 45-feet long and 20-feet wide. We had to swim the length of the pool underwater. Having already gotten my feet wet, my confidence was on the rise, and this test proved easy to accomplish, although the bouyancy of the helmet made it hard to stay underwater throughout the entire distance.

With the underwater swim completed, the moment arrived for our first trip into the 9-D5 dunker. We had been instructed in the classroom on the actions to take before, during and after the dunker hit the water. We were split into "crews" of three, two aviators and a crewmember, and were taken to chairs placed in the same position as the seats in the dunker were arranged. There we were seated in the same arrangement we would be in during the dunk, to orient ourselves and to practice the movements we would take to egress. As the crewmember, I had the entire cargo area to myself, with two aviators in the cockpit.

Our crew was number 1, and I had the honor of being the first person to ascend the steps to the dunker. In addition to the thoughts of what I would have to do during the dunk, I was conscious that there were divers under the water and around the side of the pool to assist anyone who got stuck or panicked. I buckled myself in and, after giving the "thumbs up" signal, prepared myself for the drop by bracing myself in the seat. The drop into the water was straight down about 12 feet but, because I had braced myself, it was not an extreme jolt.

The 9-D5 started filling with water and rotating immediately, much faster than I had thought it would. I had just enough time to grab my reference point and take a shallow breath of air before my head went under. We had been instructed to wait until the dunker stopped moving, count to six, then release the seatbelt and exit. That entire sequence seemed to take minutes, not seconds.

I exited with no problems, and aside from getting water up my nose and in my mouth, my first dunk had gone smoothly. One of the aviators in my crew got one of the straps of his PFD caught on the cyclic stick and had to be helped out, causing some concern and excitement among the remaining members of the class. He was OK, though, and we all got back in line for the next dunk.

We switched positions in the dunker for the second dunk, and now that I knew what to expect, I was a little calmer. Everything went smoothly for me on the second dunk. We were given blackout goggles to simulate darkness for the third and fourth dunks. I had been having problems timing my last breath of air before submersion and, as I hit the water on the third dunk, it occurred to me that I couldn't see well enough to know

when to take that last breath. The next instant I was under water with more water in my lungs than air, but again had no problem making the egress. By this time I was absolutely certain that one more dunk was all that was needed to qualify, and that I should recommend a change to the course of instruction.

While I was receiving the instructions on how I would exit in the final dunk, my mind went blank. I was determined to complete the training, but I just could not think through the correct steps to take to make an exit. I went into the dunker hoping those divers knew how to do their job, because I knew that I would be needing their help. As we dropped into the water, my hand left the seat to grab my reference point but missed it. As the panic rose, so did the water, and again I took in more water than air, which caused me to go under completely unprepared both mentally and physically. I released the seatbelt before the dunker stopped rotating, and was tumbled around inside, losing all sense of direction and any sense of where I was in the dunker. All the things they had warned us not to do, I did! My mind began working again but, without any references, I was totally disoriented. The panic left and I started putting my hands out in front of me, trying to locate a reference for orientation. I didn't find the opening although I attempted to make some new ones using my head as a battering ram. Within a matter of seconds, the diver reached in and pulled me out. I got out of the pool and realized that, if that had been the real thing, I would have been a fatality. My dunker training was complete, and all that was left was the sea survival training the next day.

The class began the next morning with 2 hours of instructions at the Deep Water Environment Survival Training School at North Island NAS. Among other items, we were instructed on the use of equipment, edible animals/fish/plants, signaling techniques, organization of personnel and assets, and how not to drink the salt water! Then it was issuing of equipment: flight suit, flight gloves, helmet, boots, wet suit and PFD. We were bused out to board the boat that took us into San Diego Bay.

We were using two 13-person inflatable rafts and six 1- person inflatable rafts. The rafts were thrown into the water first; then one by one we jumped into the water and began swimming out to the raft. The first person to the raft inflated it, then assisted the others in boarding. All of this went off without any problems and, although it was a very snug fit, we settled in to spend a few hours floating around, practicing using the pen gun flares and MK-13 signaling devices, inventorying our equipment, assessing the strong and weak points of the personnel onboard, and bailing water, bailing water, bailing water.

We had been told to establish a chain of command immediately, and appoint a log keeper, ration custodian, morale officer, etc. It quickly became apparent how important those actions were. There was a disagreement in our raft as to who had the most time in grade and whether it should be an Army or Navy officer in charge, which lent an air of confusion and anger—and this was only a training exercise! After those problems had been resolved, we waited for the helicopters to appear that would be lifting us one-by-one out of the water and back to dry land.

I was scheduled to be one of the last to be picked up, so I resigned myself to wait my turn, and quickly realized how uncomfortable it was to be wet and cold with no sign of relief in sight. When my turn came, I swam away from the raft about 100 yards to be picked up, hoping that none of the local inhabitants would take more than a passing interest in me. As the CH-46 hovered over me, the rotor wash simulation of the previous day seemed sadly unrealistic—the real thing was taking my breath away and blinding me, in addition to churning up the water into little waves that made it extremely difficult to remain vertical in the water. When I grabbed the cable and tried to hook up, it seemed as if the D-ring on my PFD had shrunk to the size of a nickel while the size of the hook had tripled in size! Although I tried several times to make the connection, I couldn't do it, and finally, after becoming completely out of breath and three-fourths full of sea water, I waved the helicopter away. It had all seemed so easy the day before! The safety boat came and put someone in the water to help me hook up the cable, and the helicopter came back to try again. Everything went smoothly this time, and I was hoisted 75 feet up into the helicopter. After being unhooked, I made my way to a seat and buckled in, hoping that I would not have to use any of the training I had received.

This training taught me a lot of things about what actually happens when a helicopter goes into the water (90 percent do rotate 180 degrees after impact, and they all sink), how to get out and what not to do. It also taught me that fear alone can kill you. It taught me that no matter how much you talk about and envision what it is like and how you will react, only training can best prepare you to react instinctively and immediately to an emergency situation.

In my opinion, swimming is a skill that should be required of all personnel in the Army. Emergency aircrew evacuation training is required by Forces Command Regulation 350-3, chapter 3, paragraph 3-5f. When applicable, training should include ditching, underwater evacuation and use of life rafts. Training for Army crewmembers in what to do after the aircraft enters the water is not covered by the aircrew training manual and should be included under special tasks to include standards.

The excellent training offered by the Navy is available to any command, if requested though the proper channels. I certainly did not lose anything by taking this training and gained more than I can relate.

Do YOU know what you would do if your aircraft had just hit the water and was sinking?

PEARL'S

Personal Equipment And Rescue/survival Lowdown

Army Western Region Aviation Survival School

Effective 1 October 1986, The Army Western Region Aviation Survival School (AWRASS) was established as a *Sixth* Army area school collocated with the 6229 Reserve Forces (RF) School at Vancouver Barracks, WA. The primary mission is to provide survival training to all aviation personnel (pilots and aircrewmembers). Subjects covered are shelter building, land navigation, ground-to-air signaling, survival vest and kit components and their use, survival medicine, firecraft, food and water procurement and other subjects. The school consists of 2 academic days, followed by 2½ days of training exercise in the field in this intensive course. This course also fulfills the survival training requirements outlined in AR 95-17. The fiscal year 1988 course schedule is as follows:

COURSE DATES	COURSE TITLE	COURSE NUMBER
7 to 12 February	Cold Weather Survival	8808SC
8 to 15 April	ALSE Officers Course	8809SA
10 to 15 April	Basic Land Survival	8810SB
17 to 22 April	Basic Land Survival	8812SB
1 to 6 May	Basic Land Survival	8814SB
8 to 13 May	Basic Land Survival	8816SB
14 to 19 August	Hot Weather Survival	8818SH
21 to 26 August	Hot Weather Survival	8820SH

Quota control and course enrollment are handled telephonically. Active Components/Active Guard Reserve should have a DD Form 1610, Army Reserve should have a DA Form 1058, and National Guard should have a NGB Form 64.

Overwater survival courses will be available starting in late March 1988. Call Sixth U.S. Army Aviation Division to enroll: AUTOVON 586-3883/4133 or Commercial 415-561-4133/3883.

To schedule courses or for additional information for any of the courses call the 6229th RF School at Commercial 206-694-5357/5358 or 503-285-5577.

The point of contact (POC) is MAJ Lathrop or SFC Johnson at Commercial 206-694-5357/5358 or 503-285-5577.

Facsimile System for Special Measurement Clothing

The Directorate of Manufacturing, Defense Personnel Support Center (DPSC) now has a facsimile system for ordering special measurement clothing requests. All field activities and clothing sales stores with facsimile capabilities use the system for special measurement clothing items only. Send requisition, DD Form 1348, and measurement blank, DD Form 111, for special measurement clothing.

The facsimile system number is AUTOVON 444-7927 or Commercial 215-952-7927. The POC at the Directorate of Manufacturing is Mr. Aaron Wilson, AUTOVON 444-3927.

NOTE: Requests for special measurement footwear are still to be submitted to the Defense Orthopedic Footwear Clinic.

Hood, Flyer's

Funded requisitions are being accepted by DPSC (RIC-S9T) for the following sizes of the hood, flyer's, currently available in supply channels:

Size	National Stock Number	Tariff
Small	8415-01-167-7242	151
Medium	8415-01-167-7243	363
Large	8415-01-167-7244	325
X-Large	8415-01-167-7245	161

This item is the companion piece for the jacket, flyer's, heavyweight nylon, CWU/45-P, national stock number

(NSN) 8415-00-310-1111(s). The hood's unit price is $29.45, and the unit of issue is each (EA).

Signal Kit Distress, Foliage Penetrator (L119)

The signal kit, NSN 1370-00-490-7362, is a component of the vest, survival, NSNs 8415-00-177-4818 and 8415-01-173-8098. The kit is obtained from the Armament Munitions and Chemical Command (AMCCOM) for replacement purposes, and is included with the Defense Logistics Agency's depot issue of the vest.

Because AMCCOM is experiencing a shortage of this kit, action has been initiated to expedite procurement; however, delivery is not expected until third quarter fiscal year 1988. The interim replacement kit that can be used until June 1988 is the signal kit (L116), type M185, NSN 1370-00-3119-7560. This interim replacement kit is available from AMCCOM routing identifier code (RIC B17). You can also refer to PM aviation life support equipment (ALSE) messages 161700Z June 1987 and 301400Z June 1987, subject as above, for safety and use instructions for the interim replacement kit. The POC is Mr. Boone Hopkins, PM ALSE, AUTOVON 693-3215.

New Survival Equipment

In the past several years, new components for the survival kits have been entering the supply system. Many aviation units are ordering them along with extra items for training.

The new aviation survival spark lite firestarter, NSN 1680-01-233-0061, will soon be available, but please remember it takes time to get these items into the system.

The general purpose knife sharpener has not been approved as of yet. You will be alerted when it does happen.

A word about the new nonsafety matches, NSN 9920-01-154-7199. These matches are contained in a 3-inch diameter by 2½-inch deep, high-impact plastic container. There are 4 boxes of 30 matches each inside the container. Do not remove the matches from the container and stow them with the current plastic match box. The time to do this is when you are in an actual survival situation.

New Equipment Being Developed

Water in the survival kits will soon have a new look, in fact, some of the water packages are already available. The packages are flexible, pliable and take up little space. Instead of the current slap-test method presently used on the can, you will have to weigh the plastic containers and eyeball the container for abrasions, scuffing and legibility of the printed instruction. When you place them into the survival kit, make sure that nothing will puncture them.

Survival Food Packet

Our North Atlantic Treaty Organization allies have developed a new survival packet. Natick Laboratories have been testing and evaluating these survival food packets. As soon as they prove to be of use for our aircrew personnel and they are type classified, we will notify you, the users.

Army Support Activity Digest

Have you ordered the new *Army Support Activity Supply Digest* yet? You can obtain the latest issue from the U.S. Army Support Activity, P.O. Box 13460, ATTN: Vickie Di Domenico (STRAP-P), Philadelphia, PA 19101-3460, or call her on AUTOVON 444-2569. The *Supply Digest* contains a wealth of information and will certainly prove invaluable.

Delayed Implementation of AR 95-17, Paragraph 2-9B

Headquarters, Department of the Army, DALO-AV Message R 102018Z November 1987, subject as above, has delayed the implementation of AR 95-17, paragraph 2-9B, until May 1988. U.S. Army Southern Command and U.S. Army Western Command have been supplied with 100 percent of their requirement. The fielding of the PRC 90-2 continues to go to the U.S. Army Forces Command as listed: A. JTF-B; B. Multinational Force; C. Alaska; D. Ft. Campbell, KY; E. Ft. Bragg, NC; F. Ft. Ord, CA; G. DAMPL Sequence. As these installations receive the PRC 90-2, their PRC 90 radios will be turned into the depot to be issued against backorders.

In the interim, the pilot in command (PIC) will continue to ensure that not less than one fully operational survival radio is onboard the aircraft. This does not preclude other crewmembers from carrying additional radios onboard the aircraft when assets are available. Additionally, the PIC will ensure that crewmembers without radios have other required signaling devices; e.g., L119 foliage penetration flare signal kit and the signaling mirror. For HQDA, the POC is MAJ Hinds, DALO-AV, AUTOVON 227-0487, and the HQ TRADOC POC is CPT Camp, AUTOVON 680-2348.

If you have a question about personal equipment or rescue/survival gear, write PEARL'S, AMC Product Management Office, ATTN: AMCPM-ALSE, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798 or call AUTOVON 693-3817 or Commercial 314-263-3817.

U.S. ARMY SAFETY CENTER

UH-60 Black Hawks of the 101st Airborne Division.

FY87

One of the Best Years in Aviation Safety

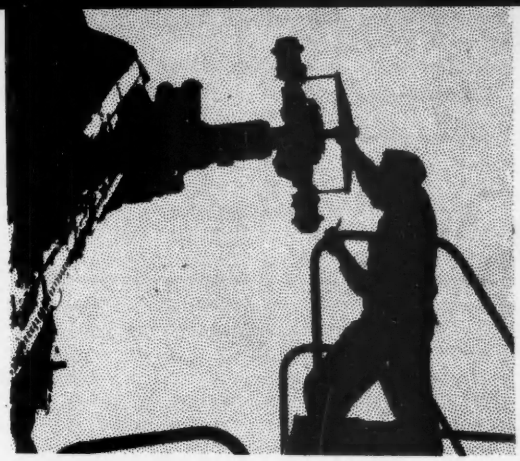
WE HAVE JUST recorded one of the safest years in Army Aviation history. The momentum of fiscal year (FY) 1986—when we had the best Class A rate ever—carried over to FY 1987. In FY 1987 we had the lowest number of Class A-C aviation accidents in 10 years and the third best Class A rate in history—2.22 per 100,000 flying hours.

Credit for this goes to all of you in Army Aviation who have enthusiastically accepted the challenge of training for peak readiness and, at the same time, protecting and safeguarding our aviation resources. Each of you can be proud of the contribution you made to this record.

To really understand the significance of the progress we have made in aviation safety over the past 5 years, we need to remember where we were in FY 1982. That year, the Class A rate was 3.23. Had this rate continued over the past 5 years, we would have had an additional 58 Class A aircraft accidents at a cost of more than $100 million, not to mention the increased loss of life and decreased combat capability.

This record takes on even greater significance when you consider that it was achieved during a period of increasing aviation mission demands. Every year mission demands and exposure have increased, and tough requirements have been placed on top of already tough requirements.

In FY 1982, about 43 percent of our total flying hours were in the high-risk environment; that is, terrain flight at



Proper maintenance procedures play a big part in keeping a good safety record.

night with night vision goggles, slingloads and hoist missions. In FY 1987, about 90 percent of the total flying hours of our combat-ready divisions were in the high-risk environment, with some units reporting as high as 65 percent of their total flying hours at night with night vision goggles at nap-of-the-earth levels.

We are now operating our helicopters at treetop level, in marginal weather, under radio silence and in multiaircraft formations. And we are flying more at night with night vision goggles, where a single performance error greatly increases the probability of a major accident.

The mission is not going to get easier. We've got to be smarter about the training, smarter about managing the risks involved in training, and in reducing and controlling the risks. There is no choice to make between realistic training and safety. If we are to be capable of performing effectively in combat, we must have realistic training. By the same token, if we are to conserve our resources so we can perform our mission in combat, we must have safety. . . both in the combat environment and in tactical training. So what do we do to meet this challenge—to add tough requirements on top of an already tough mission, and, at the same time, improve on our safety record?

Tactics for better aviation operations

Surveys of several units and interviews with commanders and safety officers revealed that units with successful safety programs share some common denominators.

- Training standards are established, and training is conducted to those standards.
- Development of knowledge, skills and combined overall capabilities of individual aviators is considered the primary responsibility of command.
- Establishing individual aviator training as the first priority ensures flying time is available to achieve and maintain flight proficiency standards.
- No-notice checkrides are conducted. Instructor pilots instruct, not just administer checkrides. They instill confidence in aviators.
- Clearly defined performance criteria are established for all phases of operations, and commanders ensure personnel are aware of the performance criteria.
- Aviators are proud of the fact that their organizations conduct flight operations by the book. Senior aviators assist in training inexperienced aviators in by-the-book operations.
- Maintenance is also performed by the book. Command requires it, and maintenance officers and noncommissioned officers ensure it. Required maintenance manuals are available to all personnel.
- Immediate and effective enforcement action of leaders reinforces self-discipline. Immediate action creates an awareness of intolerable behavior and the consequences of any deviation from proper flight discipline.
- Senior aviators police their own, and breaches of flight discipline are not accepted by anyone in the organization.
- Commander involvement is one of the most important factors found in safe aviation units. Commander positions are filled by individuals having extensive aviation background and experience and who are strong in management and leadership abilities.
- Commanders are actively involved in operations planning and require active involvement of essential and special staffs.

Some other tactics found in safe units include a highly selective pilot in command appointment process. Pilot in command is considered a status earned instead of something automatically given. Crews are carefully selected, with total and recent flight time considered. Experience is paired with inexperience, and flight crew skills are matched with the type mission to be flown.

Experienced aviators are selected as safety officers, and aviation safety officers are actively involved in unit operations. Appointment of senior aviators as safety officers is the key to well-managed programs. Aviators and commanders listen when skilled and experienced safety officers speak.

These proven tactics came from people in the field—people just like you—aviation unit commanders, safety officers, operations officers, pilots and maintenance people. They allow high-performance units to train smart and safe while achieving better mission results. These are the units and the people who are responsible for the progress being made in safety—they are the ones to whom credit belongs for years like 1986 and 1987.

AVIATION PERSONNEL NOTES

Warrant Officer RA Promotion Board

The recently released results of the 1987 Regular Army (RA) promotion board emphasizes that Aviation Branch warrant officers are indeed "above the best." In the first-time-considered category for CW2, CW3 and CW4, selection rates are equal to or above the Army's average. These selection rates reflect the large number of Army Aviation warrant officers who continue to improve their educational levels, both military and civilian. The message is clear: to remain competitive for promotion the Aviation Warrant Officer Advanced Course (military education level B) is a must and an associate degree (by the ninth year of warrant officer service) is highly recommended. The chart below shows a comparison of aviation warrant officers to the total Army statistics for the 1987 RA promotion board (CW2/CW3/CW4).

	Aviation first time considered/selected/percent	Army Average first time considered/selected/percent
CW2	34/34/100	197/197/100
CW3	183/155/84.6	577/488/84.5
CW4	141/125/88.6	293/254/86.5

Aviation Field Grade Officer Refresher Course Update

Inquiries from the field make it necessary to update information on, and to clarify enrollment procedures for, the Aviation Field Grade Officer Refresher Course. The U.S. Army Aviation Center, Ft. Rucker, AL, has completed development of a first generation nonresident refresher course. The course contains 43 subcourses that were developed using off-the-shelf materials. Some of the subcourses are being revised to reflect new changes in doctrine and tactics, and to put the material in the correct subcourse format. The total number of subcourses may be reduced as a result of the revision process.

The course is available to Aviation Branch field grade officers and promotable captains being reassigned from a nonaviation assignment to an aviation assignment. The course will acquaint these Aviation Branch officers with the latest Army Aviation doctrine, tactics and new equipment systems.

Details about course content should be addressed to: Commander, U.S. Army Aviation Center, ATTN: ATZQ-CAT, Ft. Rucker, AL 36362-5263.

Eligible officers desiring to enroll should forward a request to: Headquarters, Department of the Army, ATTN: DAPC-OPE-V, 200 Stovall St., Alexandria, VA 22332-0400.

35P Basic Noncommissioned Officer Course (BNCOC)

The 35P BNCOC was established to provide technical training to personnel in the avionic field who are designated 35P30 staff sergeants. As a 35P30 staff sergeant, soldiers are expected to provide technical assistance, quality control and supervise any and all avionic personnel; these skills are not inherent in the military occupational specialty (MOS) experience and require the additional BNCOC training.

The course itself is a 19-week, group-paced, resident course conducted at Ft. Gordon, GA. There are 3 phases, 1 week, 5 weeks and 11 weeks in length, respectively. The first week is BNCOC common-core training consisting of (skill level 3) supervisory techniques developed by the Sergeants Major Academy. The next 5 weeks are dedicated to advanced electronics fundamentals while the last 11 weeks stress intensive hands-on training in the subjects of communications, navigation, radar and stabilization equipment repair.

All personnel in pay grades E5 and E6 who hold MOS 35K, 35L, 35M, 35R or 35P are eligible for attendance. Selection is determined by the Student/Trainee Management System-Enlisted Phase II. Because of the highly technical nature of the course, it is imperative that selectees study the following materials before reporting to training:

FM 11-60
FM 11-61
FM 11-63
FM 11-66
FM 11-67
FM 11-72
TM 11-684

Failure to review these materials will cause academic difficulty, as BNCOC assumes basic electronic theories contained in the references will be mastered before attendance.

DA Photo Deficiencies

Despite increased Department of the Army (DA) emphasis concerning submission of DA photos, centralized selection boards continue to note photo deficiencies. A particular case in point is the last captain promotion board, which noted a significant number of files with no photographs at all. This situation reflects unfavorably on individual officers as well as the chain-of-command.

It is imperative that each officer's file is properly constituted. The file must contain a photo that is both current and presents the individual in the best possible fashion. This is a joint responsibility of the individual officer and the chain-of-command. Increased attention is required to ensure that the files of all officers being considered by DA centralized selection boards are current and accurate.

Officer Board Schedule for Fiscal Year (FY) 1988

Following is a list of officer selection boards scheduled to convene during the remainder of FY 1988, with their dates. Dates may change, but were current as of this printing.

BOARD	*DATES*
PROMOTION	
Captain, Army and Conditional Voluntary Indefinite	8 Mar to 1 Apr
CW3/4, Army of the U.S.	5 to 29 Apr
Lieutenant Colonel, Army	6 Apr to 6 May
Major General	10 to 13 May
Brigadier General	1 to 24 Jun
CW2/3/4, RA and Over 30	26 Jul to 12 Aug
Captain, Army and Conditional Voluntary Indefinite	7 to 23 Sep
COMMAND	
Lieutenant Colonel, Combat Arms	9 to 26 Feb
Lieutenant Colonel, Combat Support Arms	23 Feb to 4 Mar
Lieutenant Colonel, Product Manager	8 to 18 Mar
SCHOOL	
Navy Test Pilot	29 to 30 Mar
Warrant Officer, Fixed Wing	24 to 27 May
Senior Service College, Army	6 Jul to 5 Aug
Command and Staff College, Army	23 Aug to 30 Sep
OTHER	
Regular Army, Army and Army Medical Department	17 to 20 May
Regular Army, Warrant Officer	15 to 26 Aug

The DA secretariat for selection board's point of contact for board scheduling is MAJ John Hamlin, DAPC-MSB, AUTOVON 221-8675 or Commercial 202-325-8675.

Aviation Standardization and Training Seminars

Since July 1983, the Directorate of Evaluation and Standardization (DES) from the Aviation Center, Ft. Rucker, AL, has been conducting Aviation Standardization and Training Seminars (ASTS). During this timeframe, the ASTS team has visited virtually every aviation unit in the world. The team has surfaced and resolved many issues that were brought to our attention by the participating unit.

Until recently, we have had no way of answering similar questions raised by other units before their assistance visit. We have eliminated this problem through the *Aviation Digest*. Periodically, we will select new issues from recent visits and publish them in the DES Report to the Field. This enhances the information exchange between the Aviation Center and the field. We at DES are here to serve Army Aviation and you, the Army aviator. If you have any questions about these issues and their responses, please contact the Evaluation Division of DES, ATTN: ATZQ-ESE, Ft. Rucker, AL 36362-5216, or call: AUTOVON 558-4691/6571.

The Aviation intermediate maintenance (AVIM) unit armament section in support of the Aviation Brigade (AB) (Light) is not adequate in the area of assigned personnel, especially if attack units are deployed in separate locations. Will the table of organization and equipment (TOE) be changed to increase the number of personnel assigned to the armament section of the AVIM unit in support of the AB (Light)? If not, who will supply the necessary support when units are deployed?

Under current Army of Excellence TOE guidelines, there is no plan to increase the number of assigned armament maintenance personnel in AVIM units. The nondivisional AVIM unit has the responsibility for supplying necessary support above the unit's capability.

Is it required that aviators provide their unit operations with true copies of Department of the Army (DA) Form 2408-12 after flying with other units? If so, what regulation states that requirement? If not, may a DA Form 759-1 be used by the aviator to record hours flown with other units?

No Army publication requires aviators to provide their unit operations with true copies of DA Form 2408-12 after having flown an aircraft from another unit. A copy of DA Form 2408-12 is an excellent method when aviators fly with other units infrequently. On the other hand, if an aviator is in a temporary duty status with another unit for an extended period, it would be much less cumbersome to use DA Form 759-1 than to return to his parent organization with a stack of DA Forms 2408-12. A DA Form 759-1, disposition form, Optional Form 41, letter, computer printout or any other legibly printed/written/typed information sheet may be used by aviators to inform their flight records section of flight time. This is a matter for individual units to decide. If a specific form is desired by the unit, instructions may be included in the unit standing operating procedure.

An issue surfaced concerning the 3- month grace period granted to those individuals on flightcrew status who do not meet their flight-hour requirements. Should flight operations submit the exception certificate for these individuals at the end of the 3-month period when the flight

requirement was not met, or should the exception certificate be submitted at the end of each month?

An exception certificate for each month during the grace period that the 4-hour requirement is not met should be submitted. (Reference: U.S. Army Forces Command letter, 7 October 1985, subject: Management of Enlisted Flying Status and Army Regulation 37-104-3, paragraph 20102.b.)

Concern has been expressed that feedback from problems in field maintenance that are surfaced during ASTS/branch training team (BTT) visits, DA evaluations, etc., is not being incorporated into aircraft qualification courses (AQCs). Newly qualified aviators should be made aware of these problems before arriving in the field. Are there procedures presently in effect that ensure maintenance problems and solutions that surface are incorporated into AQCs at the Army Aviation Center?

Problems that surface during ASTS/BTT visits are recorded and sent to the proponent office for response. Once the response is received by DES, Ft. Rucker, it is evaluated for its validity in solving the problem or answering the question. If the response is valid, it is published in the trip/afteraction report. DES will then conduct a followup study to ensure that the response is, in fact, solving the issue in question. If not, then the issue will again be sent to the proponent office for followup actions. All problems that surface during ASTS/BTT visits are brought to the attention of the proponent office that determines if it necessary to incorporate these problems/solutions into the AQC programs of instruction. The proponent will indicate that action in its response to the field in the DES trip/afteraction report.

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362-5000; or call us at AUTOVON 558-3504 or Commercial 205-255-3504. After duty hours call Ft. Rucker Hotline, AUTOVON 558-6487 or Commercial 205-255-6487 and leave a message.

New Home of Army Aviation Museum

Fort Rucker's plans to build a modern $5 million complex to house the Army's largest collection of aircraft in the free world are now a reality. The 7-year Army Aviation Museum Foundation fund drive culminated on 1 February 1988 when the $2.5 million check in matching funds for the facility was presented to Colonel Larry S. Bonine of the Mobile District Corps of Engineers, by U.S. Representative Bill Dickinson, Major General Ellis D. Parker, chief, Army Aviation Branch and members of the museum foundation.

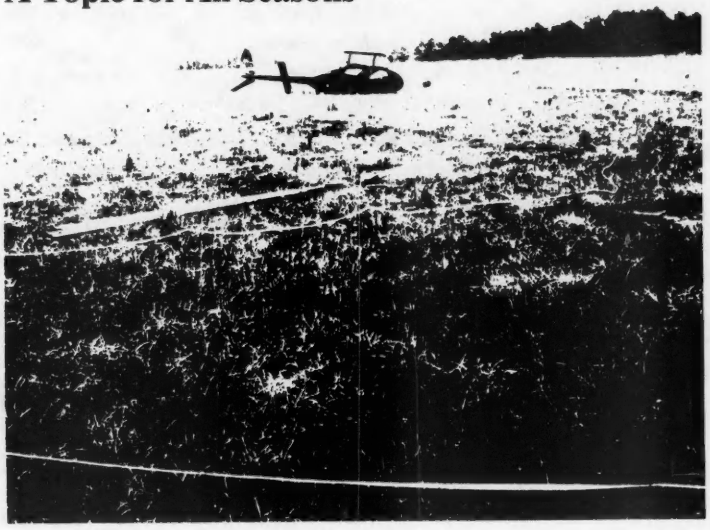
Future plans include a ground-breaking ceremony in April and completion of the ultramodern complex 18 months later.

Thanks to you. Your efforts, which made it all possible, are greatly appreciated.

Captain Tom Brockway
CW3 (P) Dan Kingsley

For ASOs Only

A Topic for All Seasons



AS I HAVE worked in some few safety jobs around the Army, I have been frustrated by certain aspects of the job that never seem to change. You safety types know exactly what I am talking about, so I will only discuss one: an effective safety meeting topic. If you get done reading before I get done talking, just shut the book. I figure this is going to be just like some of those safety meetings I have taught all these years: Some people sleep through, some are polite enough to stay awake, and once in a while, one of them actually comes across with a big 'atta boy' to keep me going.

I have always tried to pitch my safety meetings at potential trouble spots in my line-unit operations, and so have usually built my lesson plans around the current and upcoming field problems. This has never been bad, mind you, but it is situational in nature, and only applies to the immediate future. It has traditionally covered preparations to travel, weather considerations, any flight or road hazards en route, and if the terrain around the bivouac site required special instruction, I have put it out. The usual things, like mission peculiar safety considerations, were covered whenever I became aware of them. How much good did it do? I've always maintained a fairly good safety record. But then there was the time I told one of my ground troops that there was a big hole near their camp site, and not to go near it. Sure enough, 4 hours after my arrival, one of their soldiers fell to the bottom. He had heard about it in a safety briefing, and wanted to check it out. We all got serious about staying away from it after that. . . but even then, as with many safety briefings, the warning about the hole did not provide any long-term safety benefit.

Since I began teaching safety at the U.S. Army Aviation Center, Ft. Rucker, AL, in 1986, I have been able to take a close look at many of the different perspectives involved in safety, and at all the axes the different agen-

cies here grind trying to find the single answer. The bottom line in each type of safety instruction seems to be: "How can this information keep an accident from happening? How can I (the instructor) impact on the chain of events that lead up to an accident, and how can my commander make himself felt in each cockpit without choking the mission initiative?"

There are lots of ideas, but the figures have said the same thing for 10 years. Human error is the single most prevalent cause of accidents. In fact, around 70 percent every year. And, about 80 percent of these human error accidents are caused by the flight crew alone. You know, I never taught a class that would prevent crew error in my 12 years in Army Aviation before I came here. I've talked about stupid mistakes, about individual accidents, about incidents that my unit had or those they might encounter like some similar unit. I had the feeling that more than half of my job was to remind troops of the hazards around them, and gave little thought to any long-term training. Once I even spoke on fault tree analysis and the systems approach to safety. Had a man suffer massive contusions when he fell asleep and banged his head on the desk. . .

If you can relate to these observations, I have a real treat for you. In April 1987, the Department of Gunnery and Flight Systems, U.S. Army Aviation Center, Ft. Rucker, AL, was assigned to provide the Eighth Battalion Safety Day speaker, and was tasked to discuss dynamics of aircrew communication and coordination (DACC). It was felt that this presentation would impact on the source of the majority of aviation accidents, human (crew) error. What they did was to write 2 hours of original, comical and very informative script, and put on a play that I can only describe as a scream! It was so popular that the organization was tasked to do it again in September for the balance of Ft. Rucker, and it is captured, with some limitations, on videotape.

The presentation starts out with the attending crowd being involved in a taping of a lecture on DACC. Two "actors" who are presenting the material from podiums on opposite sides of the stage get into an argument, to the never-ending amusement of the crowd, and vignettes are presented from behind the curtain midstage during their discussion.

One vignette shows two AH-1 Cobra pilots chatting casually, about entirely separate topics, and nearly having an accident. One shows the bigotry of an instructor pilot with a female student. One shows the real way a flight evaluation board is run and one shows Captain Kirk of Starship Enterprise fame dealing with Klingons, Combined Federation Campaigns and expendable crewmembers. You'll meet Vanna White's understudy, Michael Jackson and the Broomhandle Trio, Chief Warrant Officer Richard Weed of Directorate of Evaluation and Standardization and many more infamous personalities.

Most importantly, the presentation impacts directly on the single most significant long-term safety problem in the Army today, crew error, and allows for a very positive transfer of information. An additional side benefit is that you have another tool to use for a good safety day presentation. One that will get you a lot of positive comments. (For all you nonsafety types, WE need love too. . . .)

If you are interested, here is how to get the presentation. You must submit a Training-Audiovisual Work Order, DA Form 3090, to your supporting Training Aids Service Office (TASO) and request the following:

#2B-011-1355-B, Dynamics of Aircrew Communication Coordination, Running Time #43:40

#2B-011-1356-B, Dynamics of Aircrew Communication Coordination, Running Time #51:10

Your TASO must send sufficient videotapes to record both sessions, and it can be in either 1/2-inch or 3/4-inch formats. Pass to them this address because the Ft. Rucker Training Service Center (TSC) will not respond to unofficial inquiries: TSC, ATTN: ATZQ-DPT-TA, Bldg 9313, Ft. Rucker, AL 36362-5000. The point of contact is Ms. Jane Preston, AUTOVON 558-2620/2116.

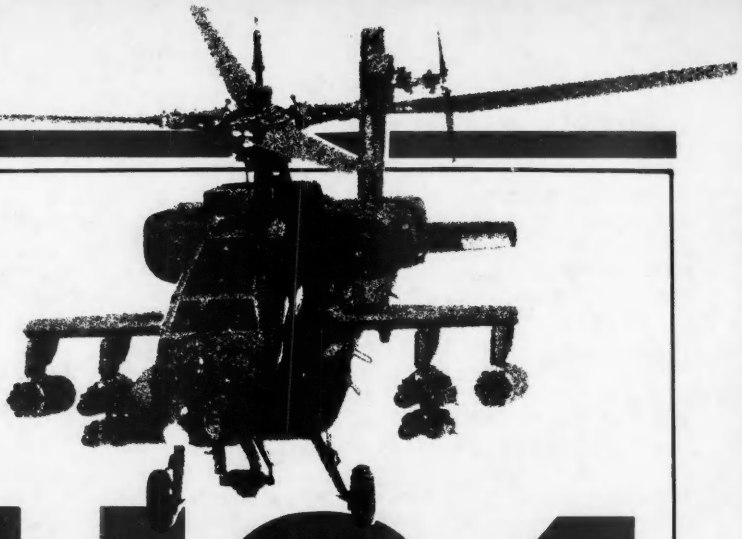
Well, do you remember all those safety meetings I told you about? Did I ever say they were exciting? Unless you're an exception, you may have the same problem. Here is a real asset that can give you a terrific safety meeting and pinpoint a whole meeting to the single greatest cause of accidents, human error. Use it and let us know how it goes.

About the Authors

Captain Tom Brockway is a platform instructor and the branch chief for the Undergraduate Branch of Department of Gunnery and Flight Systems at Ft. Rucker, AL. He helped write the DACC play and stars in it, among other things, as the Headless Aviator, Captain Kirk and one of the Broomhandle Trio.

CW3(P)Dan Kingsley is a platform instructor and the safety officer for Department of Gunnery and Flight Systems. A regular contributor to the *Aviation Digest*, he is the winner of the 1983 *Aviation Digest* Article of the Year contest and placed second in the 1986 contest.

Mr. Willis J. Brown
Mr. Jeffrey W. Van Rope



AH-64

A TOTAL SYSTEM FOR BATTLE

This article is the eighth in a series on the AH-64A Apache aircraft and weapons systems. The systems addressed include the integrated helmet and display sights system and symbology. The information contained here should familiarize the reader with the AH-64A; however, it must **not** *be used to operate or maintain the aircraft.*

Integrated Helmet and Display Sights System (IHADSS)

The IHADSS performs the functions below.

- Provides crewmembers with head communications (standard or TEMPEST) and noise attenuation.
- Determines the crewmembers' head line-of-sight (LOS) with respect to the helicopter's armament datum line (ADL), and provides this information to the fire control system.
- Displays selected sensor video and/or symbology to crewmembers.

The IHADSS consists of two separate systems—the helmet mounted display (HMD) system and the helmet mounted sight (HMS) system.

Helmet Mounted Display System

The HMD system (figure 1) provides for the display of selected video and/or symbology to each crewmember. This system consists of a display electronics unit (DEU), two display adjust panels (DAPs) and two helmet display units (HDUs). When the copilot/gunner (CPG) enables the IHADSS, both of the crewmembers' displays are active. The fault detection/location system (FD/LS) monitors the helmet display system.

The DEU (figure 2) receives both target acquisition and designation sight (TADS) and pilot night vision sensor (PNVS) video from the symbol generator, and PNVS video directly from the PNVS electronics unit. The symbol generator superimposes weapons symbology on the

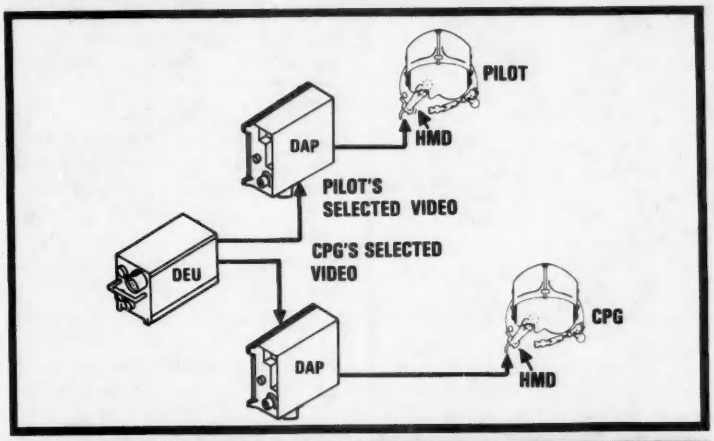


FIGURE 1: IHADSS helmet mounted display system.

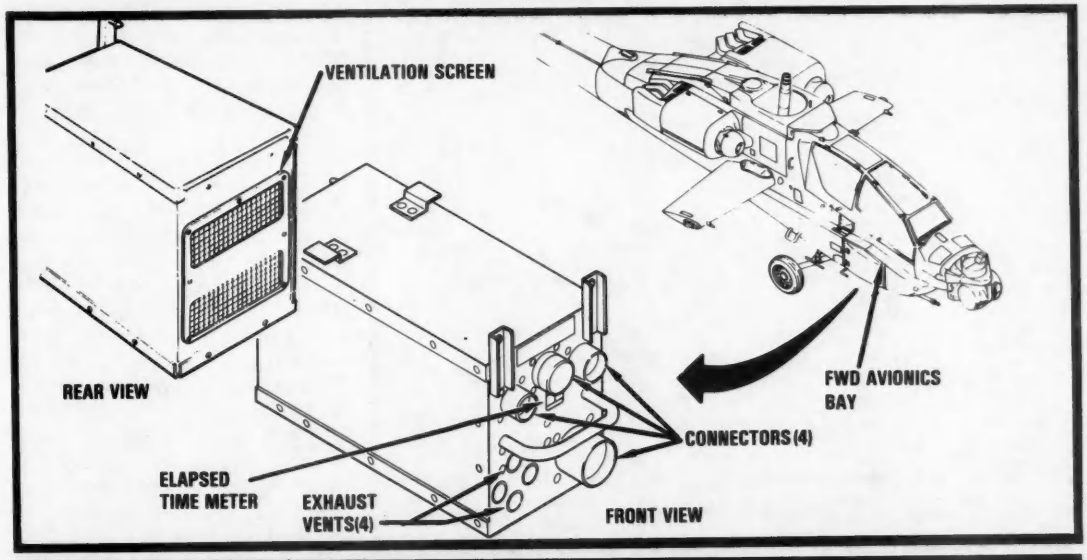


FIGURE 2: Display electronics unit.

TADS video and flight symbology on the PNVS video before routing them to the DEU. The video from the PNVS electronic unit contains no symbology.

The DEU processes the incoming video and applies adjustments to the video size/centering in response to DAP settings. During normal operation, the DEU routes selected video to the respective crewstation for display on the HDU. If the fire control system detects a failure, it commands the DEU to provide the PNVS video directly to both crewstations for display (PNVS direct video).

In each crewstation, located aft of the seat, is a DAP (figure 3). The DAPs provide size, centering and focus adjustments for the HMD displayed video. Maintenance personnel normally make these adjustments.

The HDUs (figure 4) display the selected video/symbology to the crewmembers by projecting the image onto a combiner lens located in front of the crewmembers' right eye. This permits simultaneous viewing of selected video/symbology and the outside world.

The HDUs consist of a 1-inch cathode ray tube (CRT) mounted in a high-impact plastic barrel and mounted to the forward end of the barrel, an optics assembly and combiner lens. Infinity focus, image rotation and HDU rotation are built into the barrel.

The image is projected from the CRT, through the optics assembly, and onto the combiner lens. The combiner lens is mounted in a sliding clip, which enables the lens to be adjusted to the crewmembers' eye.

The HDU mounts into the receiver assembly, which is attached to the right side of the integrated helmet unit (IHU). The HDU interfaces with the DAP via two cables. If emergency egress occurs, the HDU will be pulled out of the receiver when the cables become taut.

The HDU is stored in a cushioned holster located on the inside of the right-hand console in both crewstations. The HDU is considered part of the helicopter's equipment.

The pilot has IHADSS video (IHADSS VID) controls (figures 5 and 6) on the fire control panel for contrast (CONT), for brightness (BRT) and for symbol brightness (D + SYM BRT). And, the CPG's IHADSS video controls are on the optical relay tube (ORT) control panel. When the CPG's sight select switch is in the HMD position, the display (DSPL) controls for contrast and brightness and symbol brightness will adjust the HDU video.

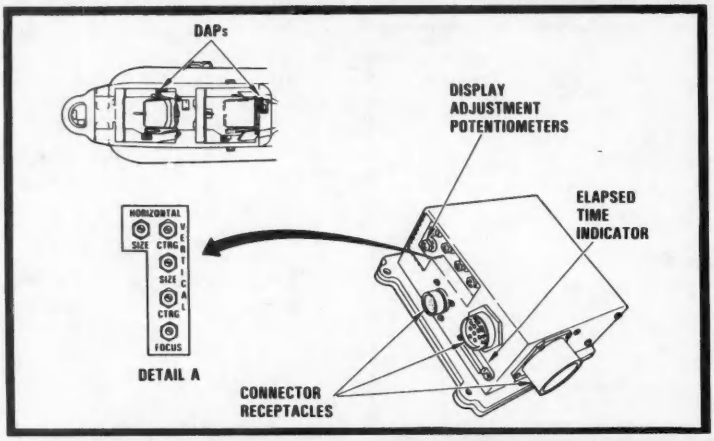


FIGURE 3: Display adjust panel.

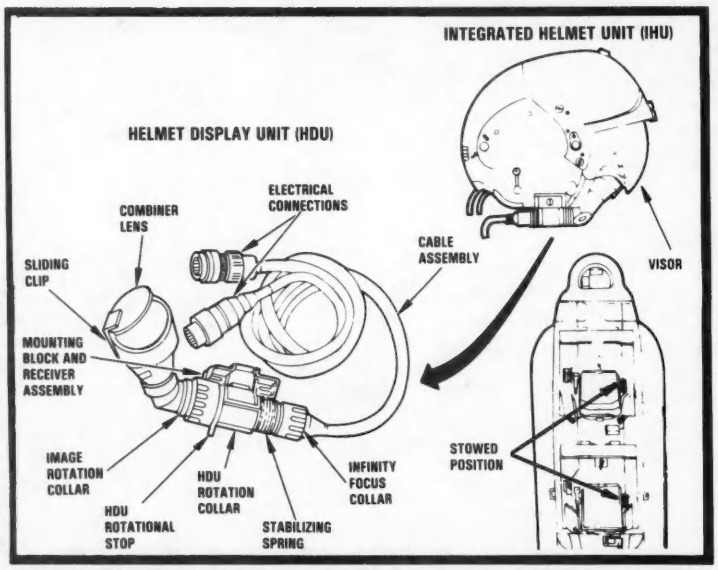


FIGURE 4: Helmet display unit.

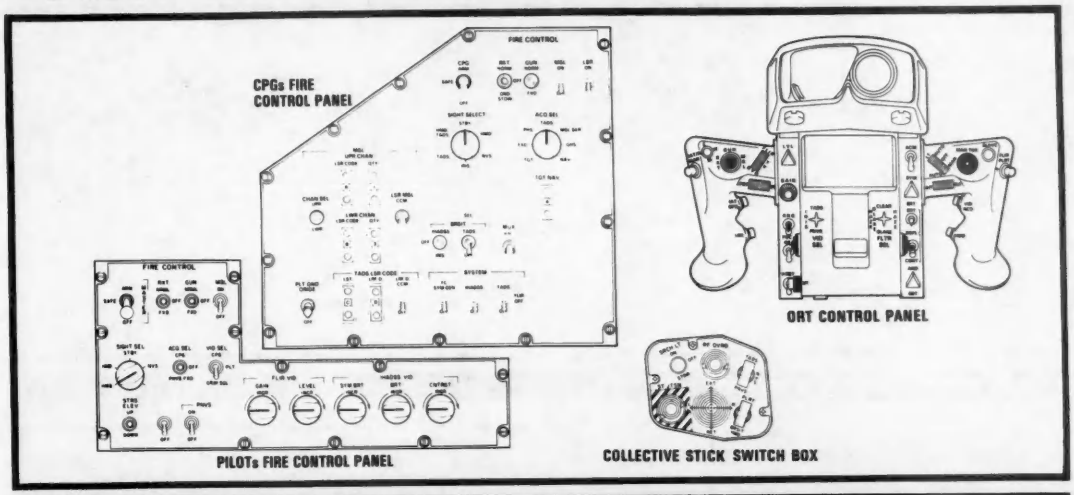


FIGURE 5: IHADSS controls.

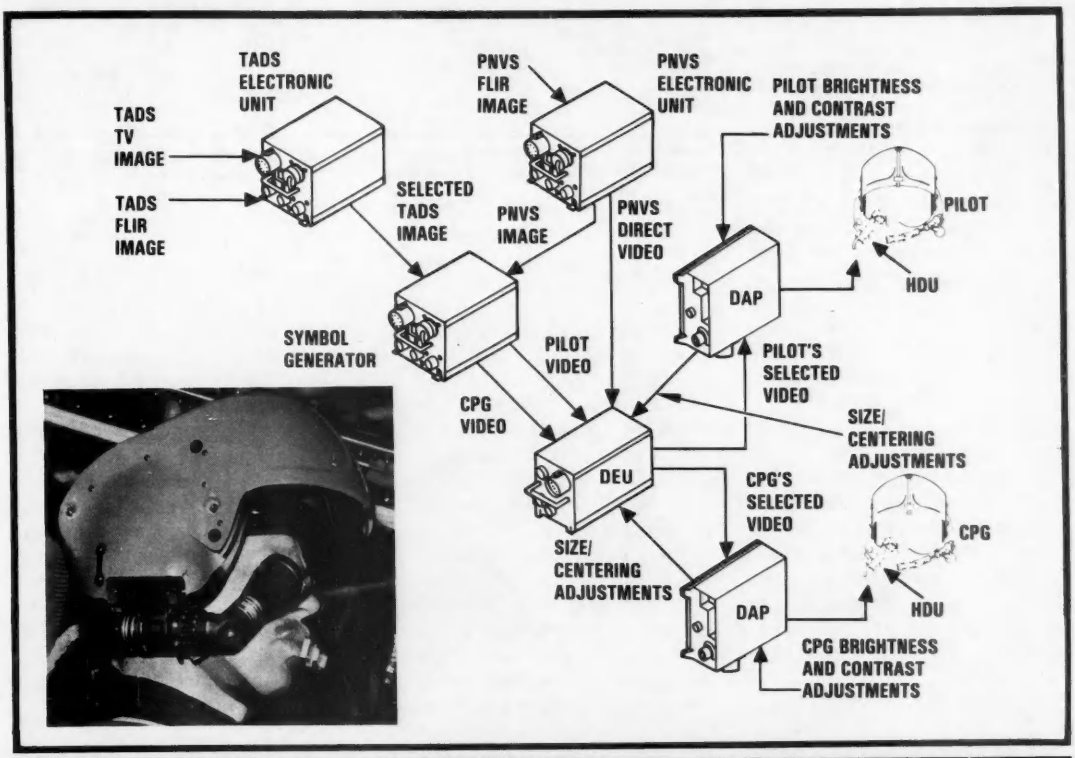


FIGURE 6: IHADSS helmet mounted display operation.

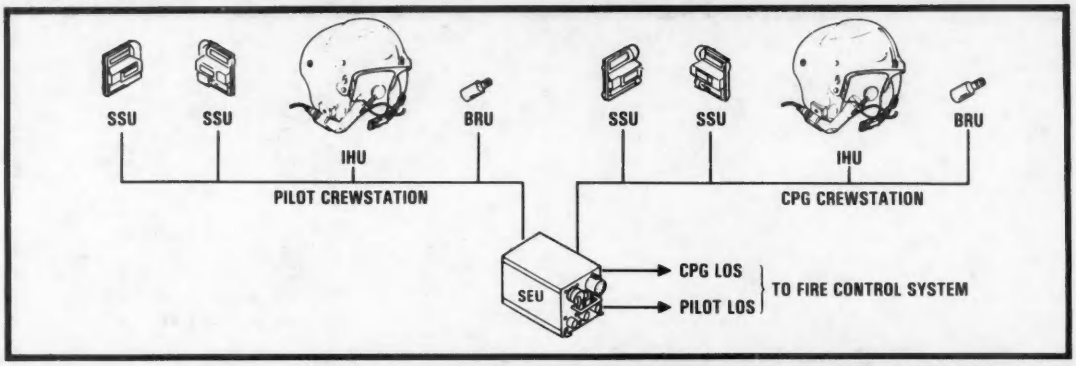


FIGURE 7: IHADSS helmet mounted sight system.

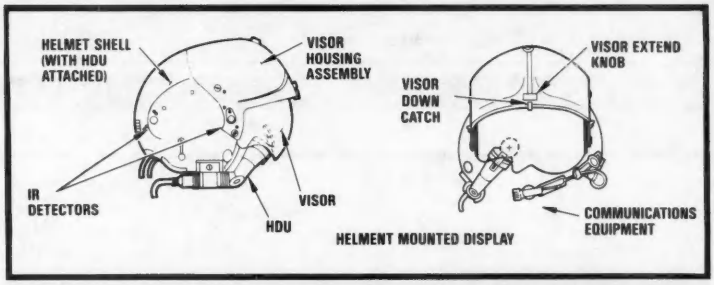


FIGURE 8: Integrated helmet unit.

Helmet Mounted Sight System

The HMS system provides—

- Head protection for the crewmember from crash forces.
- Communications (standard or TEMPEST) and noise attenuation.
- Crewmember's LOS with respect to the helicopter's longitudinal axis, referred to as the ADL.

The HMS uses the reticle displayed on the HDU as the crewmember's LOS.

The HMS consists of these major components (figure 7): A sight electronics unit (SEU), two IHUs, four sensor surveying units (SSUs) and two boresight reticle units (BRUs).

Each IHU (figure 8) consists of a shell, an infrared (IR) sensor assembly, an energy liner, and a suspension and earphone assembly. A mounting pad for the HDU is cemented to the right side of the shell.

The IR detectors respond to an IR signal, sending electrical pulses to the SEU when they detect this IR energy (position pulses).

The SSUs (figure 9), a pair located in each crewstation, generate pairs of IR energy beams that sweep the crewstation. At the start of each sweep cycle, each IR beam causes the SSUs to send a reference pulse (time zero) to the SEU. The SSU's IR energy cannot be detected outside the crewstation.

The SEU receives the reference pulses from the SSUs and the position pulses from the IHUs. By calculating the time of each position pulse in reference to the reference pulses, the LOS of each crewstation is determined. The crewstation LOS is then provided to the fire control system.

The BRU (figure 10) is an electro-optical device that provides a collimated target reticle used to boresight the IHADSS in that crewstation. This boresight establishes the position of the crewmembers' right eye with respect to the reticle displayed on the HDU and the ADL.

The SSUs generate two flat, fan-shaped beams of IR energy (figure 11). These beams rotate, or sweep, the crewstation. At the start of each sweep, a reference pulse is sent to the SEU.

When an IR beam illuminates an IR detector on the IHU, the beam generates an electrical pulse, which is also sent to the SEU. As the crewmember moves his head (IHU), the timing between the output position pulses changes.

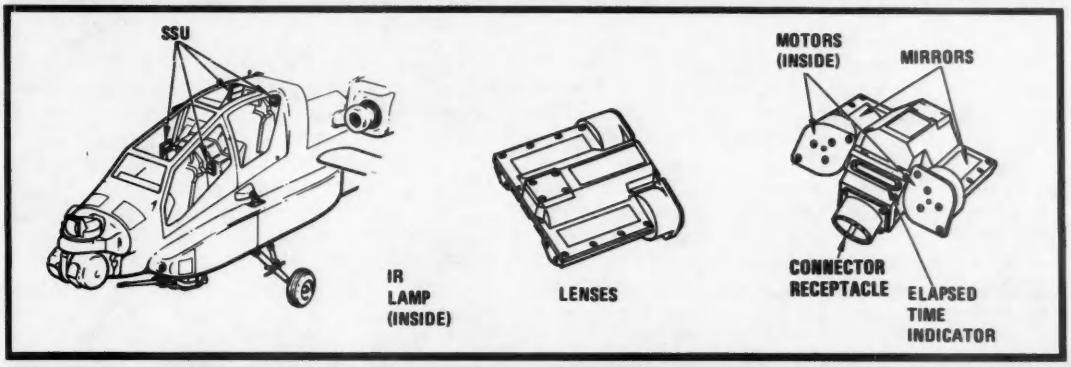


FIGURE 9: Sensor surveying unit.

The SEU compares the timing between the reference pulses from the SSUs and position pulses from the IHUs, and computes an LOS for each crewstation. If the SEU cannot compute a valid LOS for a crewstation, it freezes the LOS at the last valid computation until the LOS is again computed valid.

If the SEU determines that a boresight is required (for either or both crewstations), it informs the fire control system of the requirement. Also, the "BORESIGHT. . . REQUIRED" message is displayed to the affected crewmember, informing the crewmember of the boresight requirement.

When the IHADSS has been detected as NO-GO (one or both of the crewstations), the message "IHADSS. . . FAILED" will be displayed to the affected crewmember. The fire control system will default the LOS of the failed crewstation to the fixed forward LOS.

The SEU also provides a self-test of the IHADSS system, and provides this information to the FD/LS.

The LOS is used for target handoff, sensor pointing, automatic ranging and weapons aiming.

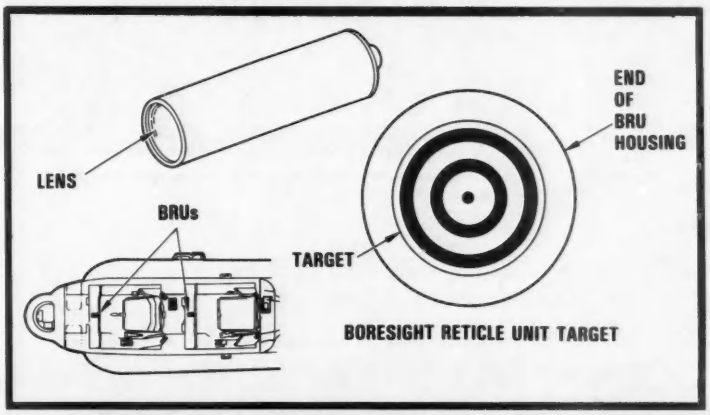


FIGURE 10: Boresight reticle unit.

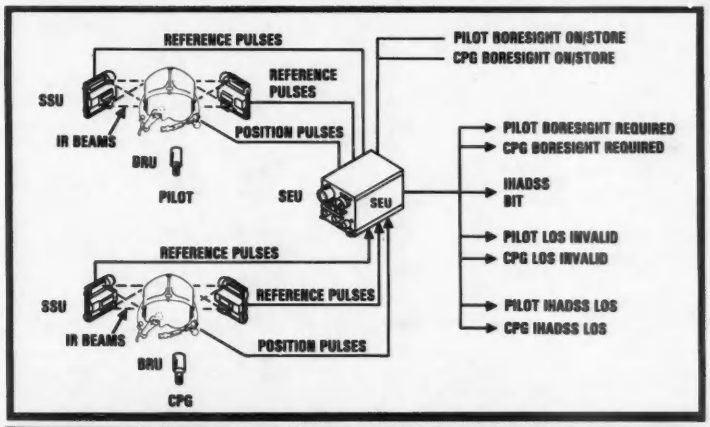


FIGURE 11: IHADSS helmet mounted sight operation.

Symbology

Symbology is the representation of aircraft flight and weapons parameters/status through the use of symbols. These symbols can be graphic representations of parameters, numeric values or alphabetic messages.

Symbology is presented on the pilot's video disk unit and HMD and on the CPG's HMD and selected TADS display when the symbol generator is on and the displays are active (figure 12).

The PNVS generates a video that is routed through the PNVS electronics unit (PEU) to the symbol generator. This video contains no symbology. The symbol generator superimposes pilot symbology on the video, and provides this video/symbology to the display as selected by either crewmember.

The TADS has two video sources, television and forward-looking infrared (FLIR). These videos are routed to the TADS electronics unit (TEU), which adds two pieces of symbology—the image autotrack gates and the TADS LOS reticle. These videos are then routed to the symbol generator, which superimposes CPG symbology on the video, and then provides this video/symbology to the displays as selected by either crewmember. Video selection in one crewstation does not affect video selection in the other. If no video is selected, the symbology will be displayed without video.

The symbol brightness is adjusted independently in each crewstation. The range of adjustment is from bright (white) through grey to dark (black).

Although not considered as a symbology display (not driven by the symbol generator), the alphanumeric display (AND) provides weapons and sight status to the CPG when using

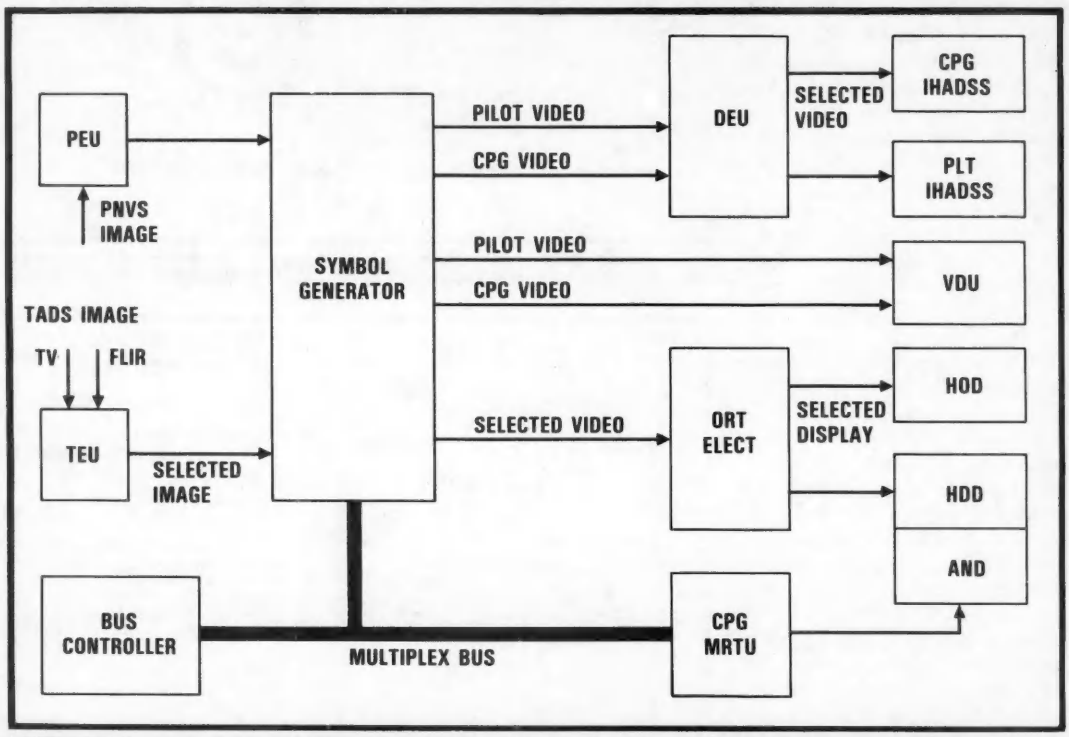


FIGURE 12: Symbology generation.

the TADS in the heads-down mode (heads-down display (HDD) active).

The AND is a light-emitting diode (LED) array and is driven directly by the fire control system (bus controller) through the multiplex system.

Symbology Groups

Symbology is divided into two groups—flight (pilot) and weapons (CPG). Although these boundaries are crossed, flight symbology is displayed on the PNVS video, and weapons symbology is displayed on the TADS video.

Flight symbology is subdivided into four modes, depending on the flight parameters of the helicopter. These modes are cruise, transition, hover and bob-up. The pilot may select any one of the four modes at any time.

Weapons symbology is divided into two subgroups, sight and weapons. The displayed symbology depends on the sight/weapon selection and the operational status of the selected systems.

Figure 13 contains the pilot's symbol set. If the driving source of the symbol fails, the symbol will go blank.

Figure 14 (on page 28) contains weapons symbols that compose the CPG's symbol set. If the driving source of the symbol fails, the symbol will go blank.

High Action Display (HAD)

The HAD (figure 15 on page 28) provides sight and weapon status, range and weapon control information to each crewmember relative to the crewmember's selected sight and weapon. The display is located at the bottom of the crewmember's display. The display is split into two fields by the sensor field of the regard box.

Alphanumeric Display

The AND (figure 16 on page 29) is a LED display located within the TADS ORT. The AND is viewed by the CPG when using the heads-down mode. Since the AND does not depend on the symbol generator for op-

Line of sight reticle represents one or more of the following, depending on the symbol using reticle as a reference:

- LOS of the pilot.
- Aft of helicopter looking forward.
- Top of helicopter looking down.
- 30 mm impact point (normal mode).

Alternate sensor bearing indicates the opposite crewmember's selected sight LOS in azimuth with reference to the ADL.

Lubber line indicates the nose of the aircraft (ADL).

Cueing dots indicate direction to cued-to LOS. All four dots flashing indicate that an IHADSS boresight is required.

Command heading represents the initialization heading if the bob-up mode is selected; otherwise the command heading is the Doppler fly-to heading.

Acceleration cue indicates the eventual end of the velocity vector.

Velocity vector represents the longitudinal and lateral ground velocities with reference to the LOS reticle (top of helicopter looking down).

Heading scale indicates magnetic heading of the helicopter with reference to the lubber line.

Cued LOS reticle is used with the cueing dots. It represents the cued-to LOS and the 30 mm impact point in the gun-fixed mode.

Missile constraints indicate required helicopter orientation for missile engagements. When in constraints, the box will go solid.

Radar altitude represents the digital readout of radar altitude (AGL) in feet.

Rate of climb represents the analog display of the rate of climb.

Radar altitude vertical scale is a reference for the radar altitude vertical tape from 0 to 200 feet, which goes blank above 200 feet.

Radar altitude vertical tape represents the analog display of rotor altitude, which goes blank above 200 feet.

Skid/slip lubber line represents reference lines for the skid/slip ball.

Skid/slip ball indicates helicopter lateral accelerations.

Cued LOS dot indicates the cued-to LOS within the sensor field of the regard box.

Field of view (FOV) represents the instantaneous FOV of the crewmembers' sensor within the field of the regard box.

Sensor field of regard represents the total field of regard of the PNVS.

Selected display shows a 30 by 40 degree FOV.

Rocket steering curser indicates required helicopter orientation for rocket engagements.

Hover position box is the display of the helicopter's relative position when the bob-up mode is selected.

Head tracker indicates the nose of the helicopter with respect to the LOS reticle.

Airspeed is the digital readout of the true airspeed (TAS) or, if not available, the ground speed (GS) in knots.

Horizon line indicates the pitch and roll attitude of the helicopter.

Engine torque indicates torque output of the highest torqued engine. At values of 98 percent or greater, a flashing box surrounds the torque value, indicating a torque limit is being approached. The torque will flash when a 12-percent torque split occurs between the engines.

FIGURE 13: Pilot's symbol set.

Alternate sensor bearing indicates the opposite crewmember's selected LOS in azimuth reference to the ADL.

Lubber line indicates the nose of the helicopter.

TADS bearing is the realite bearing of the TADS LOS in azimuth with respect to the ADL.

Heading scale indicates magnetic heading of the helicopter with reference to the lubber line.

Cued LOS reticle is used with the cueing dots; it represents the cued-to LOS and the 30 mm impact point in the gun-fixed mode.

Missile constraints indicate required helicopter orientation for missile engagements. When in constraints, the box will go solid.

Radar altitude is the digital readout of radar altitude (AGL) in feet.

Field of view represents the instantaneous FOV of the crewmember's sensor within the field of regard box.

Cued LOS dot indicates the cued-to LOS within the sensor field of regard box.

Sensor field of regard box represents the total field of regard of the TADS.

Cueing dots indicate direction to cued-to LOS. All four dots flashing indicates IHADSS boresight required.

Airspeed is the digital readout of TAS or, if not available, GS in knots.

LOS reticle represents one or both of the following: LOS of the CPG and 30 mm impact point (normal mode).

Selected display shows 30° x 40° FOV.

TADS FOV gates indicate the amount of currently displayed imagery that will be displayed in the next narrower FOV.

Rocket steering cursor indicates required helicopter orientation for rocket engagements.

Selected sensor indicates the selected TADS sensor; television (TV), FLIR, or direct view optics (DVOs).

FIGURE 14: Copilot gunner's symbol set.

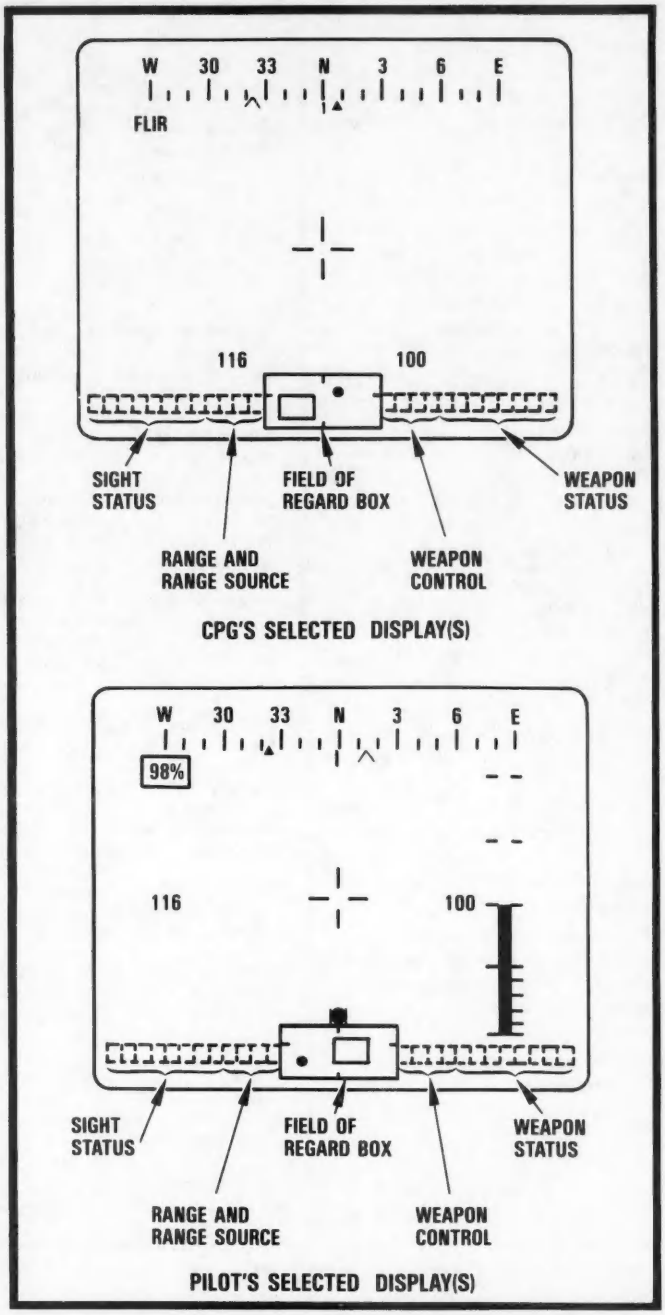


FIGURE 15: High action display.

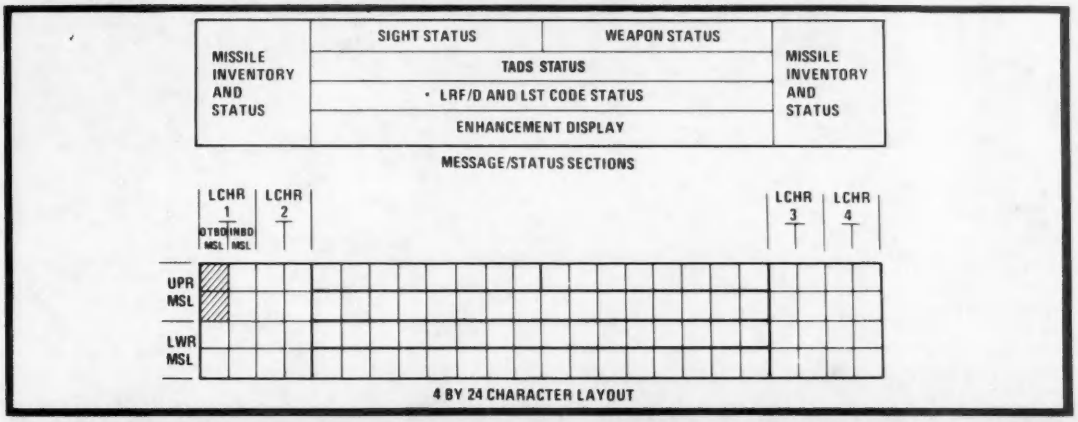


FIGURE 16: Alphanumeric display.

eration, it can be used for weapons employment if the symbol generator fails. It also provides weapon status to the CPG when the CPG uses the TADS DVO.

The AND is 24 character spaces long and 4 lines vertically. It is divided into the sections below.

- Sight status, which displays the status of the CPG's selected sight.
- Weapons status, which displays the status of the weapon the CPG has selected.
- TADS status, which displays the status of TADS sensors and trackers.
- Laser rangefinder/designator (LRF/D) and laser spot tracker (LST) code status, which displays code status of the LRF/D and LST, and indicate which laser code is being used by each.
- Enhanced display, which is used in missile and gun or rocket fixed engagements.

Symbology Use

The pilot, using the flight symbology superimposed on the PNVS FLIR image can fly and navigate the helicopter with absolutely no reference outside the crewstation. This gives the AH-64 its all weather, day/night capability.

The left field is composed of two display sections—sight status and range and range source. The sight status section displays the status of the selected sight. The range and range source section shows the range being used by the fire control system for that crewstation, and the source of that range.

The right field is also composed of two sections—weapon control and weapon status. The weapon control section informs the crewmember which weapon the opposite crewmember has selected. The weapon status section displays the status of the weapon selected by the crewmember.

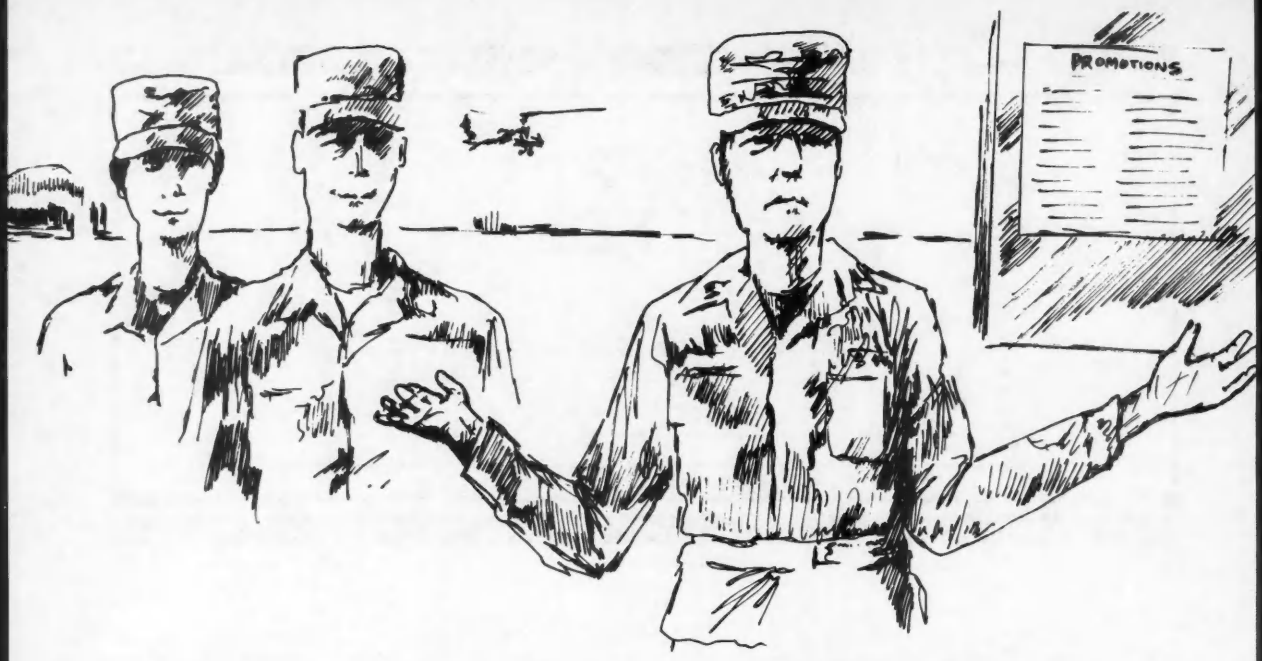
The CPG, using the symbology superimposed on the TADS video presentation, can employ the helicopter's armament in all weather, day/night conditions at extreme ranges. Thus, the AH-64 can be made a highly lethal weapons platform.

The article has addressed capabilities and characteristics of the AH-64A Apache weapon system in the subsystem of IHADSS and symbology. The next article in the Apache series will address the target acquisition and designation sight and the pilot night vision sensor.

ABOUT THE AUTHORS

Mr. Willis J. Brown is responsible for Active and Reserve Component marketing development of the Apache helicopter. He has served in U.S. Military Marketing since joining McDonnell Douglas Helicopter Company in 1985. He has an extensive background in laser guided and airborne weapons system marketing.
Mr. Brown has more than 11 years' experience in Army Aviation. He is rated in the UH-1, AH-1, Bell 206 and Bell 204.

Mr. Jeffrey W. Van Rope has been responsible for the design, development and presentation of aircrew training programs for the AH-64A, and is currently responsible for designing and developing aircrew and embedded training for the LHX.
He has more than 21 years' experience in Army Aviation, with more than 2,500 hours in rotary wing aircraft, and is a maintenance test pilot.



How Come I Didn't Make the List?

Master Sergeant
Leon F. Pelletier
Office of Personnel Systems
Directorate of Aviation Proponency
U.S. Army Aviation Center
Fort Rucker, AL

MONTHLY WRITING AWARD

HEY BILL! The new promotion list is out. What's your sequence number?" shouted Leo.

"I don't have one," Bill replied dejectedly.

Leo was shocked. "I can't believe that! You and I have been together all of our military lives. It makes you wonder how that selection process really works."

"You can say that again. What's your sequence number?" Bill asked.

"It's a high one, but it doesn't seem so great now that I know you didn't get one. I wish there was something I could say that would help," replied Leo.

"Here comes Top, probably to congratulate you. Hope you don't mind if I cut out. I'm not in the mood to listen to him right now. Hi Top, bye Top!" Bill's voice fell off as he shuffled away from the first sergeant (1SG) and Leo.

First Sergeant Lloyd was all smiles as he grabbed Leo's hand and said, "Well done, Leo. I knew you were going to make the list this time around."

"Thanks Top! Yea, I was pretty excited until I ran into Bill. How did I make the list and he did not? Our records should be identical. We've gone to the same schools, had the same raters most of the time, and I know our skill qualification test scores are equal. I just don't understand!" Leo muttered, more concerned than happy.

First Sergeant Lloyd thought for a minute and said, "I've got a good friend over in the 1st Brigade who sat

on a board last year; maybe he can shed some light on what really happens at Ft. Ben. Congratulations again Leo! I'll get back with you if Command Sergeant Major (CSM) Rivera can help us."

Later that day, the phone rang in CSM Rivera's office. CSM Rivera sat and listened to the same tale of woe he's heard a hundred times since promotions became centralized. He asked 1SG Lloyd some basic questions about both soldiers and agreed they both seemed to be qualified for promotion. Finally CSM Rivera said, "Have both men bring a copy of their fiche over and maybe we can find the reason one got promoted and the other didn't."

"I'll bring them to your office tomorrow morning. Do you mind if I bring my fiche? I hit the secondary zone this year and I want to make sure my official file is up to date," 1SG Lloyd answered.

He then called Leo and Bill to tell them to get their latest copy of their Official Military Personnel File (OMPF) fiche and meet him at CSM Rivera's office at 0900 hours the next morning. 1SG Lloyd got his first clue to the difference between the two soldiers; Bill didn't have a copy of his OMPF, Leo did. 1SG Lloyd postponed the meeting for 2 weeks, while they waited for Bill's records to come from the U.S. Total Army Personnel Agency (TAPA).

"Bill," Leo asked, "how did you review your records if you didn't have a copy of your OMPF fiche?"

"What's to review, I sent all the important papers I had to the personnel service center (PSC), formally MILPO, and those 'admin' folks take care of it from there," Bill replied.

"It may be their job to send it in my friend, but it's your responsibility to ensure everything is in there and all of it is yours. You saw how easy it was to get a copy. The personnel administration center (PAC) had the form and all you had to do was sign it and they sent it in." Leo wasn't sure if Bill had realized his responsibility to his own career.

Bill asked, "Even when I get the dumb thing, how will I know if everything is there? I can't remember all those letters and things I've sent in."

"That's easy. You collect all your paper copies and compare them with what shows up on the fiche reader. You did keep a personal copy of everything you sent to PSC didn't you?" queried Leo.

"Sort of, if there were two copies I kept one and I think I've probably got most of the enlisted evaluation report (EER) copies PSC sent back to me. I'll ask the personnel service noncommissioned officer to get my field 201 file and compare the OMPF with all the stuff in there." Bill smiled at his resourcefulness.

"Where have you been, son! They don't keep any of that in your field file any more. All they keep in the field file at PSC is your Department of the Army Form 2 and 2-1, your latest assignment orders and a few other things. They only keep local housekeeping files. Everything else is in the OMPF," Leo stated, somewhat surprised Bill was unaware of the changes to the field 201 file.

Bill asked, "What did they do with all the old stuff that was in there?"

"It was sent back to the soldiers a long time ago. Don't worry, we'll be able to spot any gaps in the EERs and you know what schools you've attended," Leo replied.

Bill's OMPF arrived and 1SG Lloyd set up another appointment with CSM Rivera, hoping to find something missing or anything that would give a clue to Bill's failure to be picked up for promotion.

The three arrived at CSM Rivera's office, and he had prepared a small conference room for them with two microfiche readers. 1SG Lloyd introduced Bill and Leo to CSM Rivera. He offered them some coffee, then asked Bill and Leo to sit in front of the readers. Bill took his position behind the one on the right and Leo took the one on the left. 1SG Lloyd turned off the lights and stood behind CSM Rivera who had pulled up a chair between Bill and Leo.

The room took on a pale blue hue when they turned on the fiche readers. Starting at the upper left corner of the first page, Leo's read, "Service Computation Data"; Bill's read, "Performance Data." Leo changed sheets so they could compare performance data. The first slide to the right was a picture on both fiches. There was no doubt it was Leo's photo, but

The official military personnel file maintained at the TAPA contains career information, while the field 201 file holds only local housekeeping documents.

Bill's was so dark you couldn't see his face or any of his awards.

CSM Rivera said, "Don't worry about that one, Bill. Look here in the lower right hand corner; it states there is another picture at frame A6 of the fiche. Do you know it was because of the poor reproduction quality of the photographs on microfiche the promotion boards now use the actual photograph?" He went on to say, "You wouldn't believe the number of soldiers who don't even have a photo in their official file. Many have outdated photographs or ones of such poor quality you have to wonder if the soldier really cares if he gets promoted. Bill, when was your last photo submitted?"

Bill thought a few minutes and said, "I guess it was 2 years ago, maybe 3."

1SG Lloyd's voice came out of the darkened room, "I had all the NCOs in the company who were in the zone of consideration in my office and emphasized the importance of a recent photo. Both of you were there; did either one of you bother to get a new one?"

"I had mine done about a week before the 1SG's meeting," answered Leo.

Bill replied, "Well I made an appointment the next day, Top, but we had that mess in the motor pool and I missed it. I thought about it a couple of times after that but by the time I got around to it the board was already in session. Anyway, you said the regulation states every 5 years is the minimum."

CSM Rivera's chin slumped to his chest and he began shaking his head side to side. In an almost sympathetic voice he said, "Look here! These are the results of the last selection board and they are representative of most boards. There were 633 sergeants first class in the primary zone and 758 in the secondary zone who didn't have a current photo in their files. Now look at the selection rates; 33.5 percent with a photo were selected for promotion. Only 2.6 percent of those without a photo were selected; that is, 36 soldiers out of 1,391 whose records were so outstanding a photo wasn't a determining factor."

Leo asked, "How much value is the photo? What can you tell about a soldier by looking at his picture? The soldier's records show his weight and height figures, his physical profile and ethnic background."

CSM Rivera smiled and related this scenario. "The board looks at the soldier's records at least twice. Once is to select those who are fully qualified for promotion. All those fully qualified are put in one stack for future consideration. The records are then separated into military occupational specialty (MOS) piles. We are given quotas for each MOS and then must select the best qualified for promotion by MOS. The competition gets real tough at this point and more often than not it comes down to the soldier's military bearing. Sure the EERs give us some insight, but the picture completes the mental impression we develop about each soldier. If there is no picture it indicates the soldier doesn't care if his records are complete or not. If the picture shows a man or woman with shaggy hair or a wrinkled uniform, it tells us he or she doesn't have much pride in appearance. On the other hand, a neat, sharp looking soldier with a proper fitting uniform, good grooming and an up-to-date photo makes a good impression. Since our job is to select the most impressive soldier, the photo is often the determining factor if everything else is equal."

Bill was staring at the CSM and asked, "You mean to tell me because I was too busy doing my job to get a recent photo, I wasn't selected?"

CSM Rivera said, "Hold on! I said, 'If everything else were equal' the photo could tip the scale one way or the other. However, to answer your question, part of your duty to yourself is to find the time to get your photo taken. 1SG Lloyd took part of his time to emphasize the importance of the photo, but let's continue and

Keeping an updated photograph showing neatness indicates that the soldier really cares about getting promoted.

see what else we have in here to see if you two are really equal."

The next slide was an EER. It was an old one. It had the complete evaluation on one side of the paper. There wasn't much room for comments and no place at all for recommendations on schooling or future assignments. Bill and Leo had basically the same comments and all "0s" for outstanding in the characteristics blocks. The CSM told them to note the lack of space for comments and the fact there was no point score on these old EERs. There were a few more EERs then a USAEEC Form 10 with their EER average and MOS test scores. Bill's average was five points higher than Leo's, but both EERs were identical.

Leo asked, "How come the average score was different?"

1SG Lloyd answered, "Prior to 1975, the EER average was computed by combining the MOS test score with EER scores. If you look closely Bill had a higher score on his MOS test, and that makes the difference."

CSM Rivera said, "In the instructions given to each board member we are made aware of the changes that occurred in 1976. We are cautioned to look at the dates and not to construe a dip in scores as a bad mark, only a change in computation methods."

"What else do you key on, when you are looking at EERs?" asked Bill.

"Like I said before, we try to form a mental picture of the NCO. The EER is the major source of information for forming our opinion of each soldier. There are four points to consider when reviewing the EER: First, the length of time covered by each report. Second, the length of time in each assignment. Third, the type of report (change of rater, special, etc.) and basis for observation. Fourth, we look at consistency of ratings over the long run. Usually, if you see one bad report in a string of 10 or 12 you tend to either overlook it or look at it closely to try and determine the reason for it. There are three areas we are asked to pay particular attention to because of their significance:

Four important points to consider when reviewing an EER are:

- **Length of time covered by that reporting period.**
- **Length of time in each assignment.**
- **Type of EER and basis for observation.**
- **Consistency in ratings over the long run.**

- First, is the scope and degree of responsibility in terms of resources, people, facilities and dollars managed as outlined in the job description.
- Second, is the trends in professional competence and performance with special emphasis on the specifics of performance as they relate to the soldier's MOS and duty description.
- Third, is the specific potential recommendations by the rating officials."

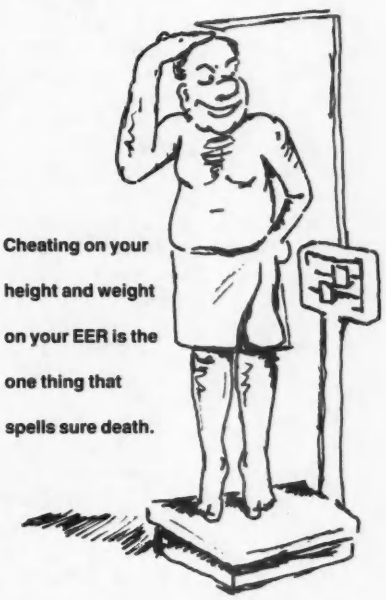
Bill said, "That sounds like a heck of a job, when you have to look at so many records. How can you keep who's who without mixing up something you read in one report from flowing into someone else's report?"

"You are right, Bill. Sometimes you have to go back and make sure you are reading about the same person. Especially when we see things like a 37-year-old man growing 2 inches in 1 year without any weight gain or loss," said CSM Rivera.

Looking through the rest of the pages was like a trip through the past, seeing the names of some of the raters and indorsers they had almost forgotten about, and they wondered how or what they were doing now. Bill and Leo had discussed a few of them when Bill came across a name neither recognized.

Bill said, "I've never been in Headquarters and Headquarters Company, 3d Air Defense Artillery Battalion, and I know for sure I've never held a 16D MOS; what gives here?"

Sure enough, there was someone else's EER in Bill's file. The first and



Cheating on your height and weight on your EER is the one thing that spells sure death.

last name were the same, but the middle initial was different and there were only two numbers in the social security number that were different. The fact that it was a below average EER didn't make Bill feel any better. He said, "Those dumb PSC guys cost me a shot at promotion. Wait until I get my hands on the clown who did this to me. I'll beat him like he stole something!"

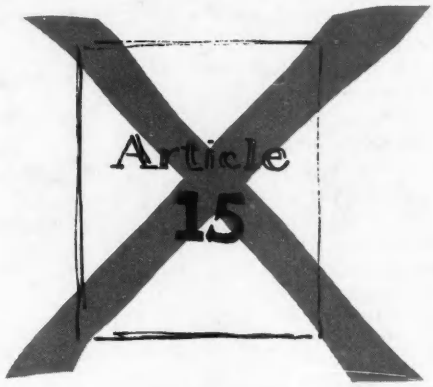
1SG Lloyd jumped in, "Well you can start with the soldier who was too busy to get his OMPF and check it out before the board. If you think those people at TAPA can't make a mistake you have just proven yourself wrong. Look at the date that document was filed, almost 3 years ago. You should have caught that a long time ago and had it removed before now. Blame yourself Bill—not some overworked clerk who made one mistake out of thousands of sheets of paper he or she filed that day."

Bill hung his head and said, "You are right Top, I just thought something like this wouldn't happen to me. Let's continue and see if there is anything else screwed up in here."

The next thing they noticed were some of the documents were out of order chronologically. The CSM said they were filed as they were received, but you could tell if a previous board had looked at the record by the little codes stamped on each document. Leo came across an evaluation report from the basic NCO course he attended a few years ago. Bill said, "I found a copy of the graduation diploma but no evaluation report, and I was an honor graduate of that class."

"I remember that you were in the class before me, and we bet that I couldn't match your average. I don't remember who won, but we were both honor grads," Leo said.

The rest of the performance data was routine and they didn't find anything interesting in either record. 1SG Lloyd asked the CSM if there were other things to look for in the OMPF that he could notify his NCOs to look for. "Glad you asked," said the CSM.



Get old Article 15s removed from performance data and put into the restricted file.

"You would be surprised to know how many soldiers haven't taken the time to get old Article 15s removed from their performance data and put into the restricted file. It only takes a few minutes at the PAC to fill out the form letter. I also don't know why more soldiers don't appeal some of the bad EERs they receive. Maybe they feel it isn't worth the effort, but believe me it is. The one thing that spells sure death is cheating on your height and weight on your EERs. Other derogatory information that will kill a career falls under civil convictions for traffic or other violations onpost or offpost. Information on drug or alcohol abuse will also be used against the soldier. Assignment limitations, e.g., airborne training, or nuclear and chemical assignment disqualification under provisions of Army Regulation (AR) 50-5 or AR 50-6 should not in and of themselves be used as criteria for nonselection. However, the actions that led to the limitation or disqualification may be appropriate for consideration."

"Those are all the bad things. What are a few of the good things we can do to enhance our chances on the board?" Leo asked.

"Well, mainly we are looking for a soldier who has a well-rounded background in his MOS and career management field (CMF). After all, we are selecting the future leadership of the CMF. Variety and scope of assignment are important. The soldier who feels he or she is getting one over on the system by homesteading at a continental United States post for many years is really hurting himself because he is not broadening his background in his field.

"Remember when I asked you to note the fact there was no space for advancement potential on the old EERs? Board members pay particular attention to the comments in that block. If the rater and indorser do not recommend more responsibility or more education, usually the board won't recommend the soldier either. Comments like, 'He will make an excellent first sergeant and/or sergeant major' are taken to heart by the board. Special duty assignments are also considered like organizational effectiveness NCO, recruiting, drill

sergeant, Reserve Component duty and new manning system duty with cohesion operational readiness and training units are all considered by the board.

"Of course, one of the biggest is civilian and military education. Now that military education is linked to promotions, the importance of becoming a distinguished or honor graduate will increase. Any soldier who spends offduty time getting a college degree demonstrates determination to succeed and is usually rewarded for that effort."

1SG Lloyd said, "You haven't said anything all of us didn't already know, or at least should have known."

"You are right, but just like Bill here, knowing it and doing something about it are two different things sometimes. Isn't that right Bill?" asked CSM Rivera.

"It sure is Sergeant Major. I see now that my own laziness probably caused the board to pass me by. You can be assured that my records will be the best I can make them by the next board."

1SG Lloyd said, "We will get AR 600-200 out and see if you qualify for the relook board because of what we found today. We also will submit the paperwork to get that other Bill's EER removed from your file. Why don't you two head back to work? I want to go over my OMPF with my friend here. I'll see you at the company later."

When they left, Bill was still a little mad he hadn't been selected, but now at least he knew how critical it was to have his OMPF in good shape. There was a glimmer of hope if he qualified for the standby or relook board later in the year. As they walked back to the company, they passed a telephone booth and Bill stopped and dropped a quarter into the slot. Leo asked, "Who are you calling?"

"My wife," Bill said. "I want her to bring my Class A uniform in to the cleaners so it will look perfect when I get my picture taken next week to include in my record."

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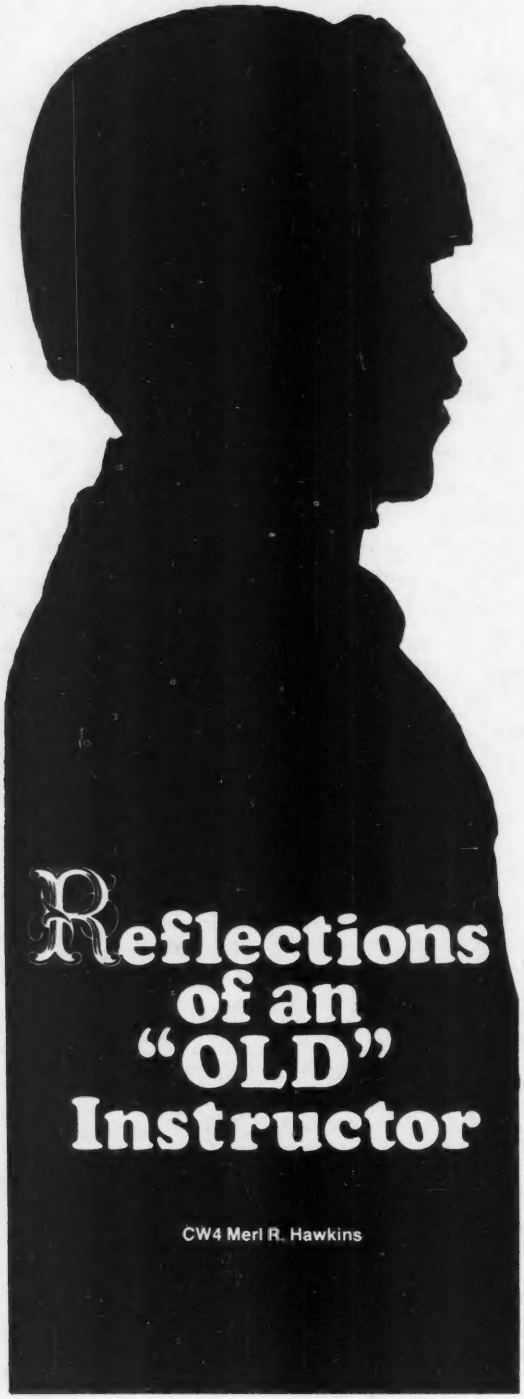
- **be currently on flight status,**
- **possess a current flight physical and**
- **possess an upslip.**

A number of aviators already entered into our subject pool cannot be reached. If you are one of our previous volunteers and have not received a letter from us recently, please contact us.

For more information, please contact USAARL at AUTOVON 558-6864 or Commercial 205-255-6864 and ask for the research aviator representative.



Reflections of an "OLD" Instructor

CW4 Merl R. Hawkins

People are never taught, they are only helped to learn.

IN OCTOBER 1968, I was assigned my first instructor pilot (IP) job as an Army aviator. Fortunately, a wise "old" CW4 and some fine Federal Aviation Administration instructors passed along some good IP traits to me. I was wise enough to learn from them. Now it's my turn to pass that information to those who follow behind me. The message may be old, but it still holds true: *People are never taught, they are only helped to learn.*

As an instructor pilot it should be your primary job to make the learning environment relaxed and as pleasant as possible. Often times we as IPs expound to great lengths on the errors that students make. But, too often we don't explain the cause or the cure. A classic example of this is IPs who tell students that their airspeed and/or groundspeed are fast, and then repeat the same information on subsequent maneuvers.

In all probability the students already know that their airspeed and/or groundspeed are fast. The problem is that they do not know how to get the aircraft to slow down. The instructor's job is not just to call out students' errors (the voice recorder in the flight simulator can do that: check airspeed, check trim) but to show the students the correct way to make the aircraft slow down.

When I first started my flying career no one cared what the airspeed indicator read during most of the maneuvers. Anyway, a lot of the airspeed indicators either didn't work or were unreliable. Emphasis was placed on what now is called "seat-of-the-pants" flying. It's actually "pitch attitude/power" flying. I was taught that, if the aircraft was at a 90-knot attitude, with sufficient power applied, and the wind wasn't trying to blow you out the right or left side of the cockpit, the airspeed indicator should read 90 knots.

Throughout my flying career, I have always carried a grease pencil and marked a line on the helicopter's forward window to show where the horizon should be in reference to the rotor disk. Whenever I was told to stop writing on the windows, I found a smudge mark, or a dead bug to look at for a reference point. During my year of flying UH-1C Huey gunships in Vietnam, I would park my helicopter on the runway, bore sight the rocket tubes to a point on the horizon, then get in the helicopter and mark the same spot on the front window. I never used the actual rocket sights, I always used my mark on the windscreen.

Being a good instructor requires a lot more than knowledge of the subject matter. It requires dedication and a lot of hard work. Good IPs are always running out of paper, not because they are busy recording student errors, but because they are always drawing pictures for demonstration purposes to help students gain in understanding. IPs should start with a lesson plan and discuss the maneuver. Next, demonstrate the correct method of performing it—then let the student try one. Finally, review the students' performances, and explain what caused their errors and the corrections they need to make. If and when you run out of paper, you will soon learn the secret of using your hands to represent aircraft. It takes practice to remain calm and smile when you feel that the students are trying to kill both of you. But, if you calmly explain their errors, and how to correct their problems, they will learn faster.

IPs should do their utmost to relieve stress in the cockpit. Statements like, "*What are you trying to do, crash*?" or "*I taught you better than that*!" or "*That's not how I showed you*," increase the students' stress levels as much as IPs who pound on the dash or shout at the students. Students may learn in this type of environment, but they will never learn well. I am sure that we have all met IPs who are "screamers" in the cockpit. They made our training either terrible or barely tolerable.

Throughout all my years as an evaluation pilot I have had a simple philosophy: *Create a relaxed, pleasant atmosphere and let the examinees demonstrate best abilities.* I have never hesitated to fail examinees who couldn't perform, but I have always ensured that they have been given a fair evaluation. In my opinion it is unfair to fail students who were taught bad techniques by their instructors. If examinees perform maneuvers that are not quite right, and the problems are caused by an error in their techniques, I'll take the time to show them the correct techniques and let them perform the maneuvers again. Examinations, whether in flight or oral, should reinforce learning. They should emphasize what the students have learned, not what they don't know. No one enjoys riding with evaluation pilots who can't wait to show you how good they can fly or how much trivia knowledge they have.

As I now pass my 20th year as an Army instructor pilot, I can reflect back on the lessons that I have learned, and the mistakes that I have made. I intend to leave a small piece of this information behind so that others may learn from me.

ABOUT THE AUTHOR

CW4 Meri R. Hawkins was assigned to the 9th Aviation Training Battalion, Lowe Army Airfield, Fort Rucker, AL, when he wrote this article.

POWER DRAG VIOLATIONS

Captain Patrick Harp
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U.S. Army Aviation Center
Fort Rucker, AL

Captain Harp was assigned to Aviation Officer Advanced Course 87-5, Ft. Rucker, AL, when he wrote this article.

EACH TIME I pick up an issue of *Flightfax*, there seems to be an accident summarized in it that was caused by violating the drag/power curve. You know, the article that sounds like this:

"While attempting an out-of-ground-effect hover in an over-gross-weight condition, 60 feet AGL, at a field elevation of 9,180 feet, with zero airspeed, the aircraft entered an uncommanded right turn. The right turn was immediately followed by a low rpm audio and light and a corresponding decrease in engine noise and rpm. The pilot, unable to stop the turn, followed the turn with cyclic for 360 degrees, leveled the aircraft and applied cushioning pitch at treetop level. The aircraft hit the ground in a right nose-low attitude and was destroyed."

Does this sound familiar? The power/drag chart has been around since the advent of flight. You cannot violate its limitations without seriously degrading your ability to maintain level flight. Yet many of the accidents in the past and present have been caused by violating this chart. These violations occurred either through ignorance (poor planning), overconfidence or a radical change in environmental conditions.

In the past few years, these types of accidents appear to have decreased, probably because of the introduction of higher powered aircraft into the inventory, such as the UH-60 Black Hawk and AH-64 Apache. These higher powered aircraft can give Army Aviation problems in the long run if not addressed now. I will discuss some of these problems later in this article. Before I go any farther in discussing the implications of this chart for Army Aviation, I think a brief discussion on the various types of drag and power is in order.

First, let me discuss the different types of drag. The three types of drag

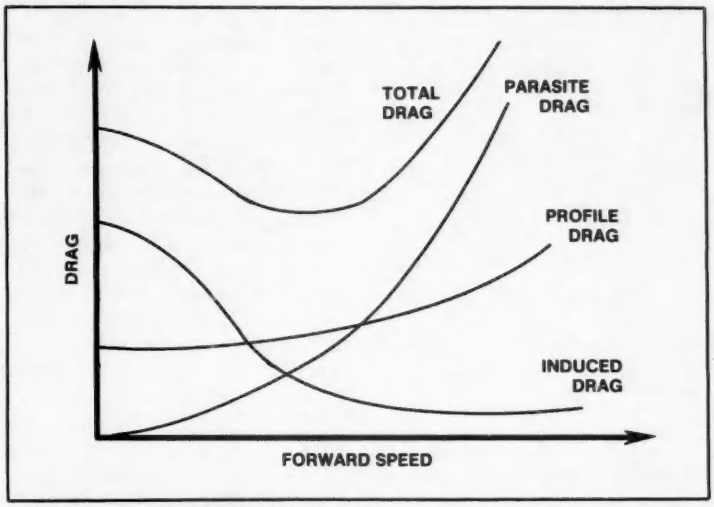


FIGURE 1: Drag and airspeed relationship.

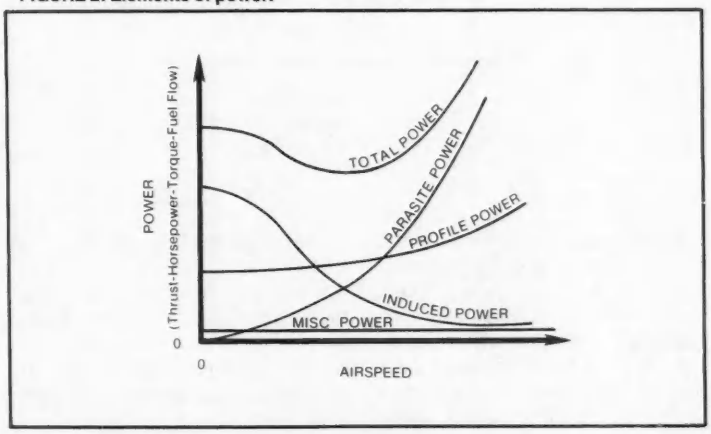
(figure 1) are defined below.

- *Profile drag* is the drag incurred from the frictional resistance of the blades passing through the air. It does not change significantly with the angle of attack but increases moderately with airspeed.
- *Induced drag* is the drag incurred by the production of lift. The higher the angle of attack, the higher the induced drag. In other words, it is highest at a hover and decreases as airspeed increases.
- *Parasite drag* is the drag incurred from the nonlifting portions of the aircraft. It includes the form drag and skin friction associated with the fuselage, rotor hub, landing gear and tailboom. Parasite drag increases as airspeed increases.
- The total sum of the profile drag, induced drag and parasite drag is *total drag*. It is primarily a function of airspeed. As aviators, this is the drag that affects our mission planning and operations, and will be the basis for the rest of this article.

The drag chart also can be used to depict power requirements at varying airspeeds. Power required is directly proportional to total drag. In other words, the higher the drag on the aircraft, the more power required to maintain flight. Because of this, the vertical scale on the chart can be changed from drag to some variable directly related to power. For this article, we will use torque. This will also require changing some of the names on the chart. We can change the different types of drag to the type of power used to overcome that drag (figure 2).

The two types of power for a rotor in hover are induced and profile power. In forward flight, these two are joined by parasite power. These are the powers required to overcome their identical element of drag. In other words induced power overcomes induced drag. The total power required is induced, profile and parasite power combined, plus some others that I'll list such as miscellaneous power. This power includes the tail rotor, hydraulic pump, gearboxes, bleed air, etc. For the purpose of this article, miscellaneous power can be omitted.

FIGURE 2: Elements of power.



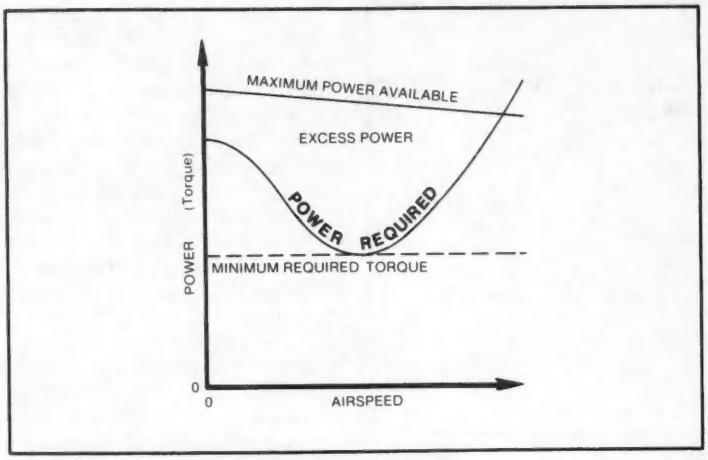


FIGURE 3: Power available for a given environment.

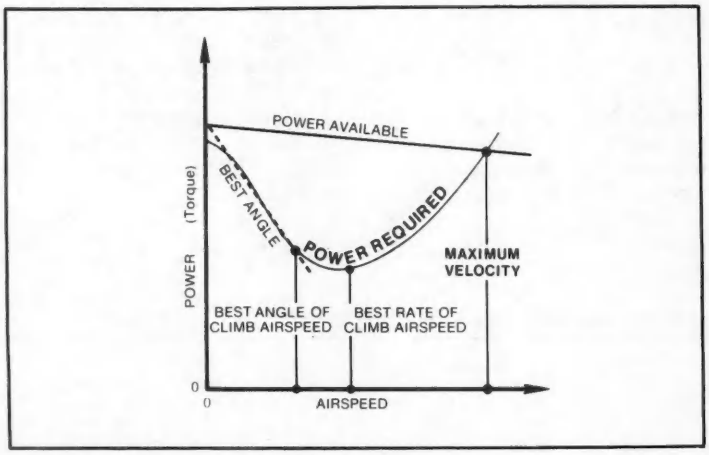


FIGURE 4: Maximum velocity of the aircraft.

In addition, we can plot the power available for a given environment (figure 3). This way, we can compare power available versus power required as in figure 3. We do this every time we fill out a performance planning card (PPC). For the purposes of this article and simplification, I have chosen to use the chart instead of the PPC.

Various performance factors can be determined from this chart. Among but a few are—

Hover power: The power required to maintain flight at zero airspeed (figure 3).

Maximum velocity of the aircraft: That airspeed at which the total power line intersects the maximum power available line (figure 4). It is not necessarily Vne (velocity never to exceed), but it is the maximum airspeed limited by power available.

Best rate of climb/maximum endurance/minimum rate of descent in autorotation: The point on the chart at which the total power required line is at its lowest point (figure 4). This is the airspeed that requires the minimum amount of power because this is the point at which there is the least amount of drag.

Best angle of climb: A straight line is drawn from the intersection of zero airspeed and power available, tangent to the power required curve (figure 4). The best-angle-of-climb airspeed is at the point of tangency. This climb obtains the maximum altitude in a given distance.

Fuel flow: The amount of fuel the aircraft is burning, based upon power demands placed on the aircraft (figure 5).

Maximum range/maximum glide: A line drawn tangent from zero power and zero airspeed to the power required line (figure 6). This line will take the airplane the farthest on a given amount of fuel or allow for the farthest glide in autorotation.

These charts appear simple, and they are, as long as the lines on the chart do not move. This is how they affect us as aviators because these lines rarely remain the same. In fact, they can move several times in either direction on any given flight.

These charts are the basis of the PPC used by aviators on each flight. The information on the PPC is an interpretation of these charts for the specific environment the aviator intends to operate in. The PPC is a quick reference within the cockpit to ensure the aircraft can perform the desired maneuver.

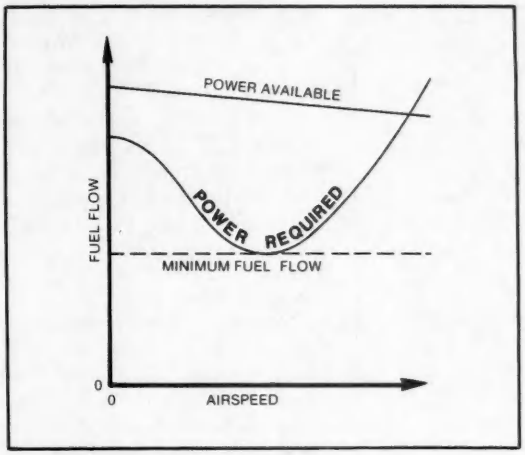


FIGURE 5: Fuel consumption.

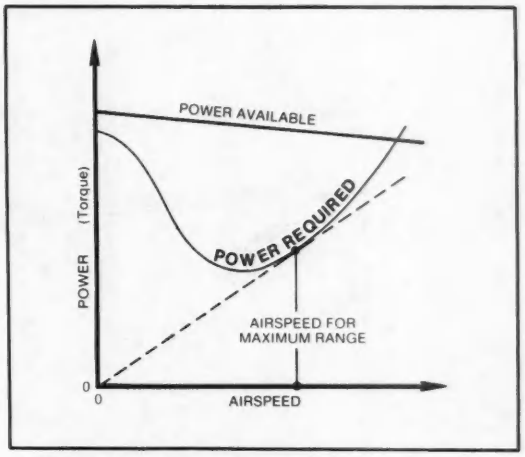


FIGURE 6: Maximum range and glide.

It is not enough to merely fill in the numbers on the card and go do the mission. It is essential that every aviator understands the basic fundamentals of the power/drag charts and how they translate into PPC information.

I would like to discuss the power chart in more detail, hopefully putting it in better perspective. In Vietnam, it was common practice to load the aircraft above the maximum allowable gross weight, and then bounce it down the runway until it was moving fast enough to become airborne. In this maneuver, the power required for the aircraft exceeded the power available to hover because of high temperature, pressure altitude and loading, but with a little airspeed takeoff was possible. So the pilot bounced it down the runway until his airspeed was beyond the point where his power required exceeded his power available, at which point he became airborne (figure 7).

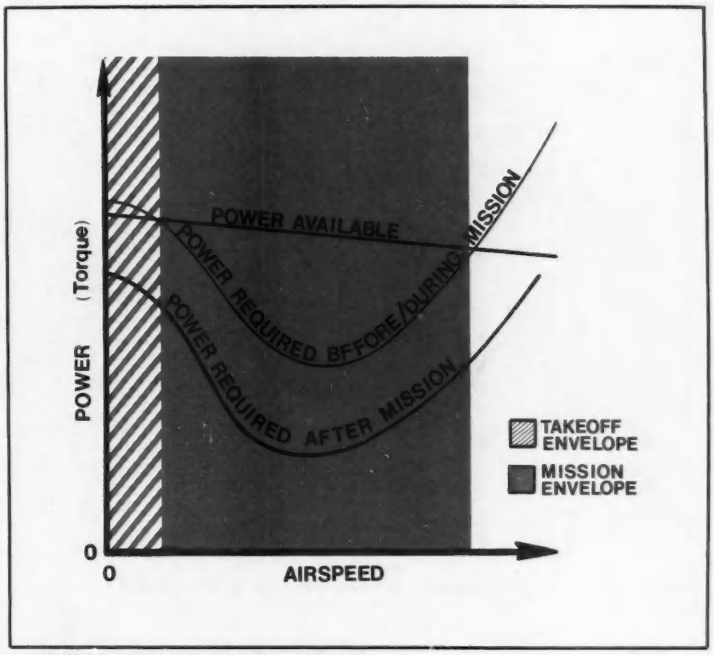


FIGURE 7: Power required for takeoff.

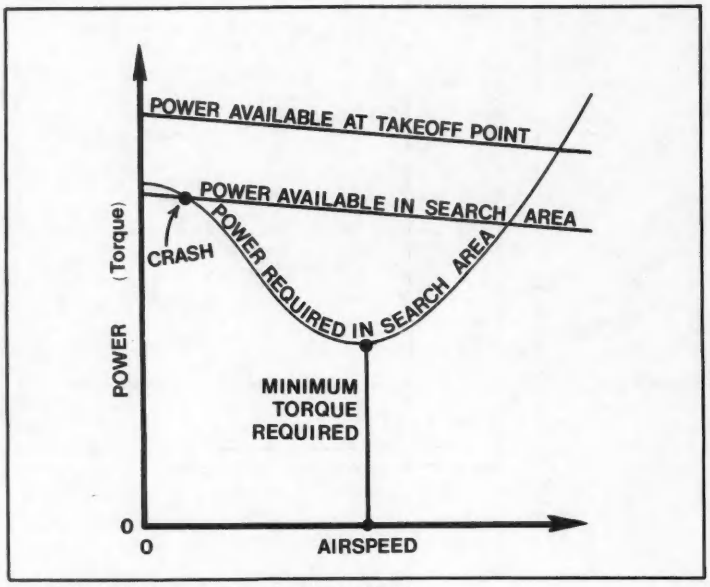


FIGURE 8: Minimum torque required for flight.

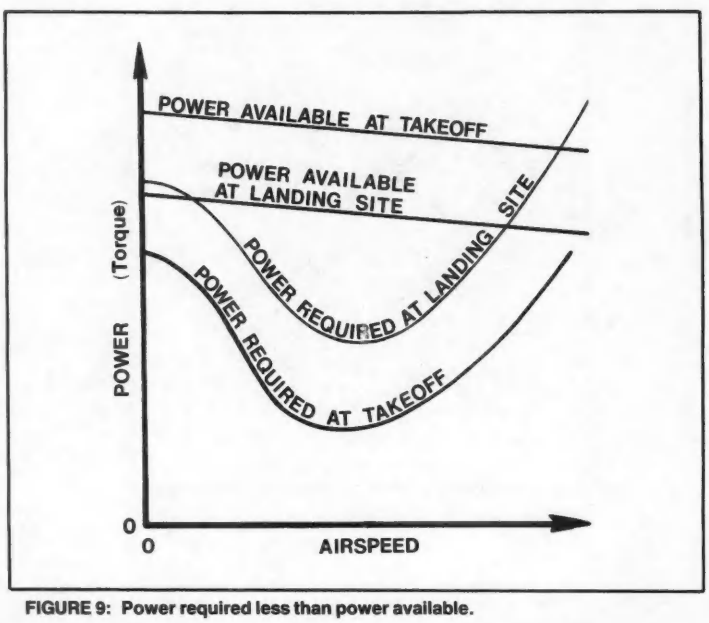


FIGURE 9: Power required less than power available.

The pilot would fire his load, and return much lighter (power required line down) to land with a normal approach.

The pilot did not violate the chart because he did not become airborne until he was within the limitations of the chart. However, if he had to return early for any reason, he would have had to accomplish a running landing because of lack of power available to hover.

The Army aviator runs into problems when the power required line exceeds the power available line. This is elementary but let's look at it. Why would a pilot intentionally violate this fundamental principle of flight? The answer is he doesn't intentionally, but unintentionally it happens all the time.

Remember the word *heavy* when applied to aircraft weight is relative. In other words, the aircraft can be loaded at maximum gross weight and have maximum power, or it can be loaded 2,000 pounds less than maximum gross weight and have less than maximum power available. Either way, the aircraft is still heavy.

A search and rescue aircraft goes into mountainous terrain looking for survivors. The pilot is systematically searching the area at 50 to 60 knots with the aircraft performing well. He is operating in terrain higher than his takeoff point. The crew thinks they see something, and the pilot slows down. This brings the airspeed into the region where power required exceeds power available. The aircraft begins to descend and crashes if the pilot does not correct the situation (figure 8). The pilot could avoid this easily if he knew the minimum torque required (airspeed) and did not go far below it.

A pilot takes off with the power required line below the power available line (figure 9). He flies for a total of 30 minutes and lands at a site with a pres-

sure altitude 5,000 feet higher than this takeoff point. He has significantly increased his power required line because of the large increase in pressure altitude. At the same time he has significantly lowered his power available line by the increase in pressure altitude.

This type of violation is the most commonly heard about in *Flightfax*. How does it get the Army aviator? Easy, the aircraft takes off and flies fine en route because of the excess power available at the lower takeoff point and in cruise flight. On final, however, as the aircraft transitions from forward flight to hovering flight, the power required exceeds the power available just when you need it the most.

It is usually avoidable if the proper amount of performance planning is conducted. Experience can help a good pilot avoid these situations or foresee them before they become disastrous, but that doesn't always work. The best method is to plan the power required versus the power available for each flight environment in which you and your aircraft will be operating. Remember, you cannot violate this chart without seriously degrading your ability to maintain level flight.

The implication for Army Aviation is that we will continue to crash aircraft as a direct result of these violations. These accidents will continue until every aviator understands the basic principles behind this chart. Granted the incident rate appears to have dropped because of higher power aircraft, but it will continue to happen.

Let's look at this problem from an Army Aviation unit's standpoint. A young, inexperienced aviator has trained for the last year in the same unit and same mission. His power available and allowable weight rarely change. Keep in mind, after a year, it's a good possibility he has made pilot in command. He is put on a mission where his maximum allowable weight and power available are decreased, and his cargo load and power required stays the same or increases. He takes off on the mission and crashes the aircraft because he does not realize the aircraft is not performing as efficiently as he is used to it performing.

This is mainly the result of thinking he has virtually unlimited power, especially in the Black Hawk. However, all aircraft have a definite power limitation that can be exceeded by weight/drag (power required) or by reducing the power available. This could be a real problem for the aviator assigned to a Black Hawk unit straight out of flight school.

The UH-1 Huey, OH-58 Kiowa and AH-1 Cobra pilots have an even bigger problem, but they are forced to deal with it on a daily basis. Given time and experience, they can handle the heavy aircraft. The brand new Black Hawk pilot is given the same amount of time and experience, but is rarely taxed when it comes to flying his machine at maximum gross weight.

This on the surface does not appear to be a problem and, indeed, it usually is not in peacetime. However, let's consider for a moment if this same Black Hawk unit deploys somewhere like Iran or Afghanistan, or somewhere where the mountains are extremely high. This relatively new pilot is now hindered because nature just lowered his power available line a great deal. Does he even know it has been lowered? Is this the time to learn the aircraft's capabilities? His PPC should tell him. Does he know what the PPC information is telling him? On the surface we pilots all say, "Of course he does." But if this is the case, why are we crashing so many aircraft from this type of violation?

There are several ways to overcome this problem. To be truly effective, we must start at the beginning. An increased emphasis in flight school could produce positive results. It is already covered quite thoroughly, but it is my experience the average flight school graduate does not understand this chart, the PPC or the consequences of violating them.

Place increased emphasis on drag/power performance criteria and performance planning. Train pilots and units as much as possible at maximum gross weights. In addition, you can have your experienced aviators constantly stress the limitations of the aircraft to the inexperienced aviators.

It is essential, however, to ensure that all of the pilots in the unit totally comprehend what their aircraft is doing to them at all times. It is not enough to respond merely to each aircraft reaction with mere control input. If the pilot understands what is happening, he can better respond to the aircraft within any given situation.

The pilot must know where his aircraft is on this chart at all times. Not only must he know his maximum power available for the specific environment he is in, but he must know the power required for each attempted maneuver within that environment. His PPC planning must be accurate and he must be able to interpret it.

Although accidents are inherent with the nature of our occupation, they can and must be kept to a minimum. Accidents of this type can be eliminated almost entirely. It requires knowing your machine and yourself, and the limitations of both. This coupled with a safe flying attitude will ensure half the battle is won. The other half is just using plain commonsense. Remember, if it doesn't feel right then it probably isn't right.

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ZES OSAASU

Mr. Dennis E. Newport
U.S. Army Aeronautical Services Office
Cameron Station, Alexandria, VA

IF ZES OSAASU looks backward to you, read on. It was meant to, because some people seem to work this way! Can you imagine buying a swimming pool for your backyard, contracting for its installation and calling your friend for the opening blast before determining that you had space for the pool and met the local ordinances governing its use?

A parallel may be drawn in the development of an airfield, airspace or aviation support facility. Imagine yourself buying navigational aids, support lighting (or whatever) and constructing a site for such without first making a procedure study to determine what operational advantage really will be gained without proper planning.

You may find that your idea won't "fly" either because of obstructions, airspace problems, signal disruptions or even disrupting the restricted area firing ranges in the approach or missed approach area. If your airfield is suitable for large aircraft, the "boys in blue" can't serve you unless applied criteria provide for category C and D operations. Other notable examples of putting the cart before the horse include hangars that are placed inside runway-clear zones, control towers that don't provide full surveillance of the traffic area or airport movement surfaces and other obstruction criteria that affect minimums.

The real point is to get down to the basic building block theory. Some Army airfields just aren't worth trying to make much more of than their original function—a liaison strip. It might be more appropriate to change your strip to a functional heliport and plan for a new airfield. Some others fit logically into station development plans and must be considered as part and parcel in all short- and long-range master planning actions.

Aviation and air traffic and airspace officers should be members of the local master planning staff. They should be available to prevent the planning of any obstructions, be it hospital or smokestack on top of the highest terrain in your only suitable approach area. If aviation or airspace officers need help or technical advice, call the Aeronautical Services Office, AUTOVON 284-7773. We have technical expertise available and will assist you in every way possible.

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